



# General Education Course NMHED Recertification Form

*This form has been designed to guide you through the recertification process for the UNM General Education course in question. Please fill out your contact information below, and then review the information about the course provided to us by the New Mexico Department of Higher Education (NMHED). After this, you will be instructed to fill out three separate narratives concerning the course and its relevance to NMHED's area and skills associated with the course.*

## UNM Course Information

|        |                          |
|--------|--------------------------|
| Prefix | <b>PHYS</b>              |
| Number | <b>1115</b>              |
| Name   | <b>Survey of Physics</b> |

## Contact Information

|       |                      |
|-------|----------------------|
| Name  | <input type="text"/> |
| Title | <input type="text"/> |
| Phone | <input type="text"/> |
| Email | <input type="text"/> |

# NMHED's Description and Outcomes for the Common Course

*The description and student learning outcomes below come from NMHED's Common Course Catalog, which can be found [here](#), and is meant to designate standard descriptions and outcomes of courses registered as a NMHED Common Course.*

## **PHYS 1115: Survey of Physics**

*Overview of the concepts and basic phenomena of physics. This course provides a largely descriptive and qualitative treatment with a minimum use of elementary mathematics to solve problems. No previous knowledge of physics is assumed.*

### **Student Learning Outcomes:**

Upon completion of this course, the student will be able to:

1. Apply concepts of classical mechanics (such as velocity, acceleration, force, inertia, momentum, torque, work, energy) to simple static and dynamic systems.
2. Apply concepts of thermodynamics (such as heat, temperature, internal energy, entropy) to simple processes.
3. Apply concepts of electricity and magnetism (such as fields, potential, charge conservation, static and dynamic induction) to simple circuits, motors, and other simple electrical contrivances.
4. Apply simple geometric and wave optics in simple situations. Optional Student Learning Outcomes
5. Apply quantum theory in simple situations such as the Bohr model of the atom, dual nature of light, atomic spectra.
6. Apply simple concepts of relativity.

## **Institution-specific Student Learning Outcomes**

*Please add additional SLOs of the general education course to the ones provided by NMHED, or if no SLOs are provided by NMHED, input the SLOs used in assessment for the course.*

## Area and Essential Skills

*Below gives information concerning the area and associated skills of the course to be re-certified. The area here matches the General Education Area of UNM; the “Essential Skills” and their respective Component Skills are characterizations of the area determined by NMHED. You will use this information to fill out the narratives below.*

### Area in which *PHYS 1115* resides: **Science**

#### Essential Skills in the Area:

##### **Critical Thinking**

**Problem Setting:** Delineate a problem or question. Students state problem/question appropriate to the context.

**Evidence Acquisition:** Identify and gather the information/data necessary to address the problem or question.

**Evidence Evaluation:** Evaluate evidence/data for credibility (e.g. bias, reliability, and validity), probable truth, and relevance to a situation.

**Reasoning/Conclusion:** Develop conclusions, solutions, and outcomes that reflect an informed, well-reasoned evaluation.

##### **Personal and Social Responsibility**

**Intercultural reasoning and intercultural competence**

**Sustainability and the natural and human worlds**

**Ethical Reasoning**

**Collaboration skills, teamwork and value systems**

**Civic discourse, civic knowledge and engagement -- local and global**

##### **Quantitative Reasoning**

**Communication/Representation of Quantitative Information:** Express quantitative information symbolically, graphically, and in written or oral language.

**Analysis of Quantitative Arguments:** Interpret, analyze and critique information or a line of reasoning presented by others.

**Application of Quantitative Models:** Apply appropriate quantitative models to real world or other contextual problems.

## Narrative Input

In the boxes provided, write a short (~300 words) narrative explaining how the course weaves the essential skills associated with the content area throughout the course. Explain what students are going to do to develop the essential skills and how you will assess their learning. The narrative should be written with a general audience in mind and avoid discipline specific jargon as much as possible.

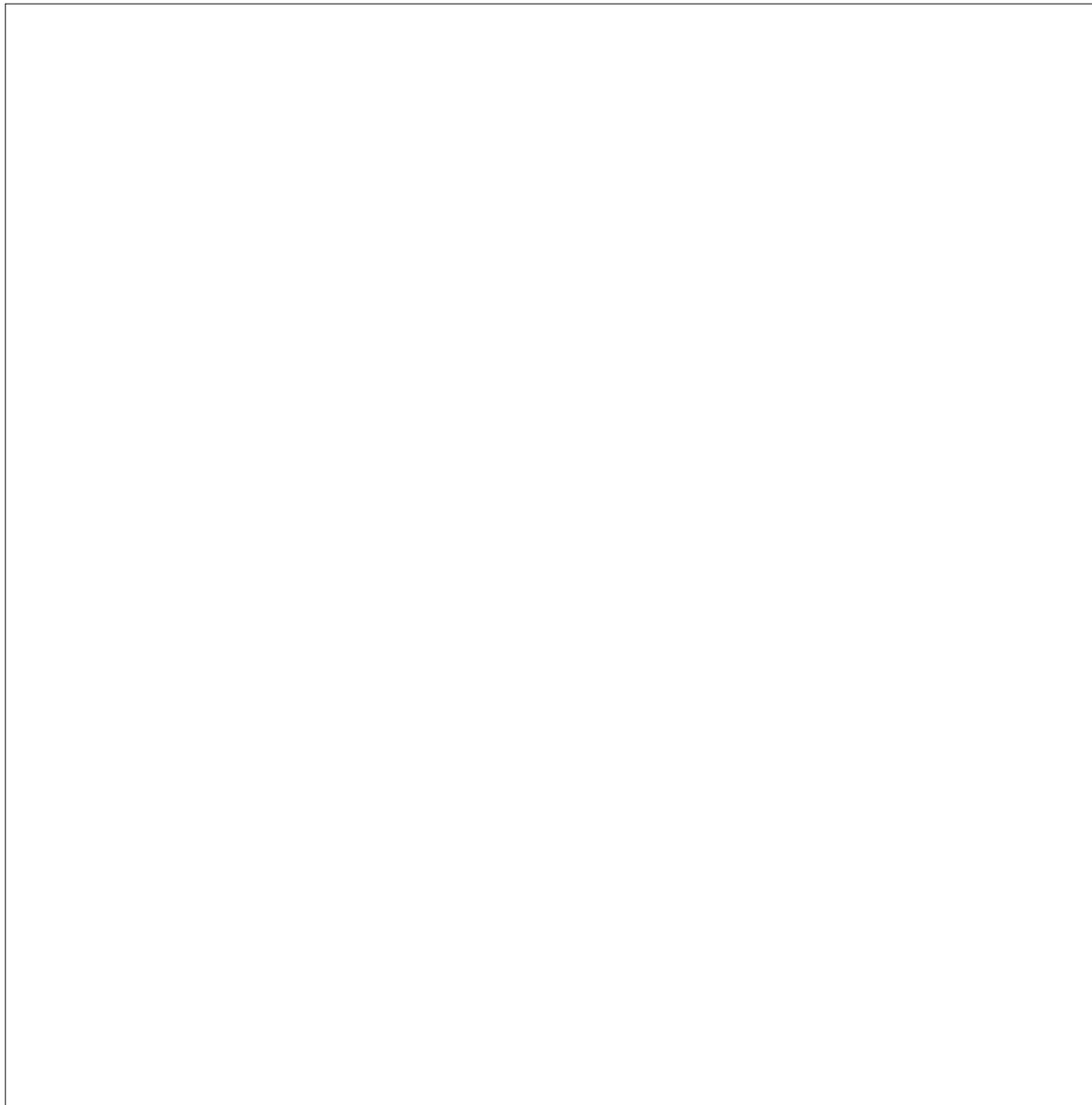
*Be sure to address the component skills listed next to each essential skills. The number of component skills that must be addressed by your narrative is listed.*

**Critical Thinking:** *Problem Setting; Evidence Acquisition; Evidence Evaluation; Reasoning/Conclusion.*

**Personal and Social Responsibility:** *Intercultural reasoning and intercultural competence; Sustainability and the natural and human worlds; Ethical Reasoning; Collaboration skills, teamwork and value systems; Civic discourse, civic knowledge and engagement -- local and global.*



**Quantitative Reasoning:** *Communication/Representation of Quantitative Information; Analysis of Quantitative Arguments; Application of Quantitative Models.*



## **Additional Information**

### **Course Materials**

*NMHED requires that both a syllabus and a sample course assignment (project, paper, exam, etc.) from the course in question to be attached to the recertification form. Be sure and pick an assignment that correlates with the descriptions provided in the narratives above.*

### **Assessment Plan**

*When it is submitted to NMHED, each general education course will also have attached the assessment plan that is used for General Education Assessment at UNM. For more information on this process, please visit this [page](#) from UNM's Office of Assessment.*

## Master Syllabus Physics 1115

**Course Title:** Survey of Physics

**Course Number:** PHYS 1115

**Credit Hours:** 3

**Instructor:**

**Office Location:**

**Office Hours:**

**Email:**

**Contact Phone Number:**

**Class Meeting Day(s):**

**Class Location/Room:**

**Class Time:**

**Term/Semester:**

### Course Description:

*At a minimum enter the description listed in the UNM course catalog. Alternatively, describe the course content, purpose, contributions, etc and what the learner may expect if enrolled in the course.*

**Course Catalog Description:** Designed to introduce non-science majors to basic concepts, laws and skills in physics, in various applications to ordinary life. Energy, momentum, force, wave phenomena, electric charge and light are discussed; also basic properties of gravitational, electromagnetic and nuclear forces. Selections from relativity, quantum theory, atoms and molecules will be included. See PHYS 1115L for an optional laboratory. Meets New Mexico Lower-Division General Education Common Core Curriculum Area III: Science.

### Course Goals:

Overview of the concepts and basic phenomena of physics. This course provides a largely descriptive and qualitative treatment with a minimum use of elementary mathematics to solve problems. No previous knowledge of physics is assumed.

### Student Learning Outcomes (aka Objectives):

*Listed are both the state and UNM-specific outcomes. Instructors are free to add any specific outcomes of their own.*

### NMHED's Description and Outcomes for the Common Course

Upon completion of this course, the student will be able to:

1. Apply concepts of classical mechanics (such as velocity, acceleration, force, inertia, momentum, torque, work, energy) to simple static and dynamic systems.

2. Apply concepts of thermodynamics (such as heat, temperature, internal energy, entropy) to simple processes.
3. Apply concepts of electricity and magnetism (such as fields, potential, charge conservation, static and dynamic induction) to simple circuits, motors, and other simple electrical contrivances.
4. Apply simple geometric and wave optics in simple situations.

#### Optional Student Learning Outcomes

5. Apply quantum theory in simple situations such as the Bohr model of the atom, dual nature of light, atomic spectra.
6. Apply simple concepts of relativity.

#### **UNM Specific SLO's**

SLO 1: Students will answer positively on at least 5 questions surveying coverage of topics.  
UNM/HED Area III, Competency, 3

SLO 2: Students will recognize basic elements of science and the scientific approach to understanding nature at least at the satisfactory level.

UNM/HED Area III, Competency, 1

SLO 3: Students will apply physical models in simple situations at least at the satisfactory level.

UNM/HED Area III, Competency, 1

SLO 4: Students will read and interpret information from graphs at least at the satisfactory level.

UNM/HED Area III, Competencies, 3, 4, 5

#### **Textbooks/Supplies/Materials/Equipment/ Technology or Technical Requirements:**

*List the required and/or recommended textbooks as well as any other supplies, materials or equipment needed to successfully complete the course. List the technology to which students must have access and the technical requirements of that technology. Courses requiring specific computer hardware and software should include product specifications needed for student success within the syllabus. These should include minimum computer and software requirements and internet configurations, or a link to a detailed reference document.*

*The syllabus for a courses requiring student-owned laptops should contain a reference or link to any requirements. An example is shown below.*

*You are required to bring your laptop to this class to follow along with or complete our in-class research exercises. UNM Law School requires that all entering students own a laptop computer. The law school does not require a particular brand but has determined a minimum hardware configuration. For more*

information please go to the Law School's IT Services page at:  
<http://lawschool.unm.edu/students/it/laptop-program.php>

## **Course Requirements:**

*List and describe all assessments which contribute to course score. May include exams, portfolios, participation, attendance, papers, oral reports, group projects, assignments, etc. Include possible point (percentage) value of each. NOTE: for dual listed courses (undergrad and graduate) list requirements for each separately.*

## **Grading:**

*Indicate how a final course grade (including credit/no credit) will be assigned, calculated, or otherwise determined. UNM uses a fractionalized final course grade system—see catalog.*

## **Course Schedule:**

List all relevant dates – lecture titles/topics; academic holidays; Spring break, exams, assignment due dates etc. An exact listing in full detail is not necessary – a representative listing is adequate.

NOTE: A disclaimer about change in syllabus is wise. For example; The Schedule of Activities is subject to change. Minor changes will be announced in class, major ones provided in writing.

## **Accommodation Statement:**

*An Accommodation statement is required for all syllabi. There is no specifically required wording. Listed below are two options acceptable to Accessibility Resource Center. NOTE: HSC, Law and distant campuses have/may have alternative and acceptable wording.*

“In accordance with University Policy 2310 and the Americans with Disabilities Act (ADA), academic accommodations may be made for any student who notifies the instructor of the need for an accommodation. It is imperative that you take the initiative to bring such needs to the instructor’s attention, as he/she are not legally permitted to inquire. Students who may require assistance in emergency evacuations should contact the instructor as to the most appropriate procedures to follow. Contact Accessibility Resource Center at 277-3506 for additional information.”

## **OR**

Accessibility Resources Center (Mesa Vista Hall 2021, 277-3506) provides academic support to students who have disabilities. If you think you need alternative accessible formats for undertaking and completing coursework, you should contact this service right away to assure

your needs are met in a timely manner. If you need local assistance in contacting the Accessibility Resources Center, see the <enter your academic program office and/or contact information here>.

### **Title IX Statement:**

*There is no University specific language nor is there a requirement that Title IX be included in the syllabus. Please check for your department, school, college or campus requirements a preferred wording. Two options are listed below.*

In an effort to meet obligations under Title IX, UNM faculty, Teaching Assistants, and Graduate Assistants are considered “responsible employees” by the Department of Education (see pg 15 <http://www2.ed.gov/about/offices/list/ocr/docs/qa-201404-title-ix.pdf> ). This designation requires that any report of gender discrimination which includes sexual harassment, sexual misconduct and sexual violence made to a faculty member, TA, or GA must be reported to the Title IX Coordinator at the Office of Equal Opportunity (oeo.unm.edu). For more information on the campus policy regarding sexual misconduct, see: <https://policy.unm.edu/university-policies/2000/2740.html>.

### **OR**

A Note about Sexual Violence and Sexual Misconduct: As a UNM faculty member, I am required to inform the Title IX Coordinator at the Office of Equal Opportunity (oeo.unm.edu) of any report I receive of gender discrimination which includes sexual harassment, sexual misconduct, and/or sexual violence. You can read the full campus policy regarding sexual misconduct at <https://policy.unm.edu/universitypolicies/2000/2740.html> . If you have experienced sexual violence or sexual misconduct, please ask a faculty or staff member for help or contact the LoboRESPECT Advocacy Center

### **Academic Integrity Statement:**

*There is no University specific language or requirement that an Academic Integrity Statement be included in the syllabus although many recommend it. Departments, schools, colleges or campuses may require different wording. Listed below is the statement listed in the UNM Student Handbook*

Each student is expected to maintain the highest standards of honesty and integrity in academic and professional matters. The University reserves the right to take disciplinary action, up to and including dismissal, against any student who is found guilty of academic dishonesty or otherwise fails to meet the standards. Any student judged to have engaged in academic dishonesty in course work may receive a reduced or failing grade for the work in question and/or for the course.

Academic dishonesty includes, but is not limited to, dishonesty in quizzes, tests, or assignments; claiming credit for work not done or done by others; hindering the academic work of other students; misrepresenting academic or professional qualifications within or without the

University; and nondisclosure or misrepresentation in filling out applications or other University records.

**Other Items:**

*Each course, program, department, school/college, campus may have other specific requirements beyond those listed above. Feel free to include such topics at your discretion while recognizing that inclusion of such is not a requirement for review by the Faculty Senate Curriculum Committee.*

## Critical Thinking

**Problem Setting:** Delineate a problem or question. Students state problem/question appropriate to the context.

**Evidence Acquisition:** Identify and gather the information/data necessary to address the problem or question.

**Evidence Evaluation:** Evaluate evidence/data for credibility (e.g. bias, reliability, and validity), probable truth, and relevance to a situation.

**Reasoning/Conclusion:** Develop conclusions, solutions, and outcomes that reflect an informed, well reasoned evaluation.

Sample Assessment Questions (Could be given as homework or on an exam):

1. Can an automobile with a velocity towards the north simultaneously have an acceleration towards the south? Explain your answer.
2. You are driving your car and turning towards the right. Your acceleration must be towards the center of the circle (to the right), but you feel yourself pressed against the left side of your car. Explain why.
3. Someone who wants to sell you a Superball says that it will bounce to a height greater than the height from which you drop it.
  - a. Is this possible? Why or why not?
  - b. Next, they say that it will bounce to a height greater than the height from which you throw it downwards. Is this possible? Why or why not?

Explain why leaving the door to your refrigerator open won't cool your house down.

## Personal and Social Responsibility - Address 2 of the 5 component skills

**Intercultural reasoning and intercultural competence**

**Sustainability and the natural and human worlds**

**Ethical Reasoning**

**Collaboration skills, teamwork and value systems**

**Civic discourse, civic knowledge and engagement -- local and global**

Sample Assessment Questions (Could be given as homework or on an exam):

1. Name one possible disadvantage to each of the following types of renewable energy resources: solar electric (photovoltaic), wind, trash incineration, hydroelectric.

2. An electric car still uses the same amount of energy as a traditional car, but it is said to use “cleaner” energy. What does this mean?
3. Do you support plans to build new nuclear power plants? Why or why not?
4. Would you personally be willing to pay more money for electricity generated with renewable energy? Why or why not?

## Quantitative Reasoning

**Communication/Representation of Quantitative Information:** Express quantitative information symbolically, graphically, and in written or oral language.

**Analysis of Quantitative Arguments:** Interpret, analyze and critique information or a line of reasoning presented by others.

**Application of Quantitative Models:** Apply appropriate quantitative models to real world or other contextual problems.

Sample Assessment Questions (Could be given as homework or on an exam):

1. You drive 50 meters in 3 seconds. You stop for 2 seconds. You drive another 50 meters in the same direction in 10 seconds. You immediately turn around and drive back to your starting point in 5 seconds.
  - a. What is the total distance you drive?
  - b. What is your total displacement at the end of your drive?
  - c. Sketch a plot of position vs. time. Be sure to label and number your axes.
  - d. Label on the graph where your velocity is positive, negative, and/or zero.
  - e. What is your average velocity for the whole drive?
  - f. What is your instantaneous velocity at  $t = 10$  seconds after you start driving?
2. Ping pong ball A has an electric charge that is 10 times larger than the charge on ping pong ball B. When placed sufficiently close together to exert measurable electric forces on each other, how does the force by A on B compare to the force by B on A?
3. The human body has an efficiency of about 25%. For every 4 calories that you eat, how many go into something “useful” and how many go into heat?
4. What is the wavelength ( $\lambda$ ) of the wave shown in the graph below? Include appropriate units.

