



## MASTER COURSE OUTLINE

### A. PHYS 2202 Classical Physics II

### B. COURSE DESCRIPTION:

This course is a continuation of PHYS 2201 Classical Physics I. The topics covered are heat, thermodynamics, electricity, magnetism, and optics. Prerequisites: PHYS 2201 Classical Physics I and MATH 1210 Calculus & Analytic Geometry I.  
**MnTC (Goal 3/NS and 2/CT); (5 Cr – 4 lect, 1 lab)**

### C. \*Core Theme: Critical Thinking \*\*Discipline Area (if MnTC): Natural Sciences

### D. RIVERLAND INSTITUTIONAL LEARNING OUTCOMES:

This course addresses the following Riverland Institutional Learning Outcome(s):

- ILO 1: critical thinking (*Core Theme Goal 2*)
- ILO 2: awareness of the larger global community (*Core Theme Goal 7 or 8*)
- ILO 3: ethical, engaged citizenship (*Core Theme Goal 9 or 10*)
- ILO 4: communication and collaboration (*Discipline Goal 1 and by any learning outcome(s) involving communication or collaboration*)

### E. MAJOR CONTENT AREAS:

- Thermodynamics
  - laws of thermodynamics
  - heat engines
  - entropy
  - kinetic theory of gases
  - thermal expansion
  - specific heat, latent heat, heating curves
- Electricity
  - electric charges, electric forces, and electric fields
  - potential, resistance, current
  - DC circuits
  - Kirchhoff's rules

- Magnetism
  - magnets, magnetic forces, magnetic fields
  - electric currents and magnetic fields
  - electromagnetic induction
- Optics

F. GOAL TYPES, OBJECTIVES, AND OUTCOMES:

<b><u>GOAL</u></b>	<b><u>OBJECTIVES</u></b> <b>Students will be able to</b>	<b><u>OUTCOMES</u></b> <b>The student will successfully</b>
<u>MnTC Goal 3a</u>	demonstrate understanding of scientific theories.	<ol style="list-style-type: none"> <li>1. demonstrate an understanding of physics theories related to thermodynamics, electricity &amp; magnetism, and optics.</li> <li>2. apply physics theories to everyday physical phenomena.</li> </ol>
<u>MnTC Goal 3c</u>	communicate their experimental findings, analyses and interpretations both orally and in writing.	<ol style="list-style-type: none"> <li>1. perform physics experiments.</li> <li>2. record, analyze, and draw conclusions from the data generated in the experiments.</li> <li>3. communicate the experimental findings.</li> </ol>
<u>MnTC Goal 3d</u>	evaluate societal issues from a natural science perspective, ask questions about the evidence presented and make informed judgments about science-related topics and policies.	<ol style="list-style-type: none"> <li>1. identify science-related questions and make judgments on physics-related issues.</li> </ol>
<u>MnTC Goal 2a</u>	gather factual information and apply it to a given problem in a manner that is relevant, clear, comprehensive and conscious of possible bias in the information selected.	<ol style="list-style-type: none"> <li>1. report on experimental data in laboratory experiments and draw conclusions based on interpretations of data.</li> <li>2. use statistical analysis in the interpretation of data and identify sources of error in data-taking procedures.</li> <li>3. demonstrate the ability to apply physics principles to explain everyday physical phenomenon.</li> </ol>
<u>MnTC Goal 2b</u>	imagine and seek out a variety of possible goals, assumptions, interpretations and perspectives, which can give alternate meanings or solutions to given situations or problems.	<ol style="list-style-type: none"> <li>1. apply 'limits/special cases' in solving a physics problem.</li> <li>2. demonstrate how alternate assumptions can lead to alternate solution to the same problem.</li> </ol>
<u>MnTC Goal 2c</u>	analyze the logical connections among the facts, goals and implicit assumptions relevant to a problem or claim; generate and evaluate implications that follow from them.	<ol style="list-style-type: none"> <li>1. solve physics problems that required logical connection between facts and assumptions pertaining to those problems.</li> <li>2. be able to pick the relevant formulas that apply to a situation or problem.</li> <li>3. draw conclusions based on the solutions to problems.</li> </ol>

<u>CS</u>	apply calculus concepts to solve physics problems.	1. use differential and integral calculus to solve physics problems.
<u>CS</u>	demonstrate an understanding of the first and second laws of thermodynamics.	1. apply the first and second laws of thermodynamics to heat engines, including Carnot engines.
<u>CS</u>	demonstrate an understanding of the field concept as applied to electromagnetism.	1. apply the concept of electric fields and magnetic fields to solve electromagnetism problems.
<u>CS</u>	demonstrate an understanding of the relationships between potential, current, resistance, and power in direct current circuits.	1. solve physics problems for DC circuits involving combinations of resistors and capacitors in series and parallel. 2. apply Kirchhoff's rules to analyze complex DC circuits.

G. SPECIAL INFORMATION:

This course may require use of the Internet, the submission of electronically prepared documents and the use of a course management software program. Students who have a disability and need accommodations should contact Accessibility Services at the beginning of the semester. This information will be made available in alternative format, such as Braille, large print, or cassette tape, upon request.

H. COURSE CODING INFORMATION:

Course Code C, B/Class Maximum 48, 24; Letter Grade

Revision date: 12/17/19; 02/06/24

AASC Approval date: 1/28/20; 02/20/24

\*These five MnTC Goals have been identified as Riverland Community College Core Themes. Every course in the Riverland Community College curriculum shall meet outcomes from one of these themes.

\*\*These five MnTC Goals have been identified as Riverland Community College Disciplines. Riverland's MnTC courses also shall meet outcomes from a Discipline Area.

NOTE: The Minnesota Transfer Curriculum "10 Goal Areas of Emphasis" are reflected in the five required discipline areas and five core themes noted in the Riverland Community College program of study guide and/or college catalog.

<b>*Riverland Community College Core Themes</b>	<b>MnTC Goal Number</b>
Critical Thinking (CT)	2
Human Diversity (HD)	7
Global Perspective (GP)	8
Ethical and Civic Responsibility (EC)	9
People and the Environment (PE)	10

<b>**Riverland Community College Discipline Areas</b>	<b>MnTC Goal Number</b>
Communication (CM)	1
Natural Sciences (NS)	3
Mathematics/Logical Reasoning (MA)	4
History and the Social & Behavioral Sciences (SS)	5
Humanities and Fine Arts (HU)	6

Riverland