NAU NORTHERN ARIZONA UNIVERSITY

Course Title: CHM 341 Physical Chemistry I
Term: Summer 2023
Instructor: TBA
Course Credit: 3
Mode of Instruction: Online

Course Description:

This course introduces fundamental principles of physical chemistry, with an emphasis on thermodynamics and kinetics. By studying the course, students will not only develop the tools to solve quantitative problems in the physical sciences, but also develop a deeper conceptual understanding of the physics that forms the foundation of chemistry.

Course Prerequisites:

MAT 137 Calculus II; PHY 262 University Physics II

Learning Outcomes:

By the end of the course, the student should be able to:

A. Explain the core ideas in physical chemistry using relevant principles and definitions;

B. Perform thermochemical calculations involving standard enthalpies of formation, reaction and phase transition;

C. Predict how the conductivity of an electrolyte depends on the electrolyte concentration and type;

D. Mathematically derive chemical reaction kinetics equations for reactions of varying complexity.

Course Material:

Physical Chemistry, Ira Levine, 6th Edition, McGraw-Hill, 2008.

Evaluation:

- 4 Lab Reports [40%]
- Mid-term Exam [25%]
- Final Exam [35%]

Description of the Evaluation tasks:

Assignment/ Essay/ ... : During the term, students will be required to finish several evaluation tasks within due date. All the tasks are linked with specific course topics/outcomes and will adequately assess students' competence and learning outcomes. Students are encouraged to meet with instructor about these tasks at any point.

Mid-term/ Final Exams/ Quiz/... : There may be periodic quizzes given at the beginning of lecture sessions; the feedback from these quizzes will monitor the progress of the learners and help to set learning priorities. There will be mid-term exam/ final exam for the course. They are the basic criteria for the evaluation of students' learning outcomes and final grade.

Grading Policy:

Students are supposed to finish each online lecture. Prior to each class, students should finish the required readings. During the class time, students are encouraged to make use of all relevant online course resources and communicate with the instructor. Students' grades are accumulated based on the cumulative evaluations.

Students' letter grade will be assigned according to the following scale:

A+ 90-100	A 85-89	A- 80-84

B+ 77-79	B 73-76	B- 70-72
C+ 67-69	C 63-66	C- 60-62
D+ 57-59	D 53-56	D- 50-52
F < 50		

Academic Integrity:

Students must strictly adhere to the university's academic integrity rule; and all essays, exams and any other form of academic assignments must adhere to these rules. Any form of plagiarism, cheating, or misappropriation of materials will be considered a violation of academic integrity and will be punishable by the university.

Withdrawal from the Course(s):

Students will be able to apply for a transfer or withdrawal within 3 days of the starting date of the course. If a withdrawal is applied for within 3 working days, the tuition fee will be fully refunded. After 3 days, the tuition fee will not be refunded. If a withdrawal is applied for in the first two weeks, it will be recorded as W (Withdraw) on the course transcript. After this initial two-week period, the class will be recorded as F (Fail).

Tentative Schedule:

1	Thermodynamics
2	The First Law of Thermodynamics
3	Heat Capacities
4	The Molecular Nature of Internal Energy **Lab Report 1**
5	The Second Law of Thermodynamics
6	Heat Engines
7	Entropy, Reversibility, and Irreversibility

	Entropy, Time, and Cosmology
8	Material Equilibrium **Lab Report 2**
9	Standard Thermodynamic functions and Reaction
10	Reaction Equilibrium in Ideal Gas Mixtures
11	Real Gases Solutions and Nonideal Solutions
12	**Mid-term Exam**
13	Reaction Equilibrium in Nonideal Systems
14	Multicomponent Phase Equilibrium
15	Electrochemical Systems
16	Kinetic Theory of Gases **Lab Report 3**
17	Transport Process
18	Reaction Kinetics
19	Quantum Mechanics
20	Atomic Structure **Lab Report 4**
21	Molecular Electronic Structure
22	Spectroscopy and Photochemistry
23	Statistical Mechanics
24	Solids and Liquids
25	**Final Exam**