

Office of Academic Affairs
Tarleton State University

Master Course Syllabus Outline

Department: Chemistry, Geoscience, and Env. Sci. Course Prefix/Number: CHEM3244

Official Course Title: Physical Chemistry II

Master Syllabus Approved by Department on: ____/____/____
month date year

I. Catalog Description (50 words; brief synopsis of course content, emphases)

An introduction to the microscopic properties of nature, including an introduction to quantum mechanics and its application to atomic and molecular spectroscopy.

II. Prerequisites?

CHEM 3234 or approval of department head

III. Expanded Course Description (150 words; primary course content, intended student level and role(s) course is to play in the curriculum)

The discovery of the behavior of quantum particles plus an introduction to quantum mechanics is the main part of this course. The results of the application of quantum theory to the electron and to spectroscopic techniques will be discussed. Students will learn the use of spectroscopy to obtain structural and energetic data about atoms and molecules. The course also includes a basic introduction to symmetry, symmetry elements, and group theory as well as the use of symmetry in theory.

IV. Intended Student Learning Outcomes? Required; **knowledge outcomes** (what students who successfully complete the course will be expected to know). Optional; **skill outcomes** (what students who successfully complete the course will be able to do). Optional; **value outcomes** (what students who successfully complete the course will value or appreciate).

Students will learn how quantum mechanics is used to describe how electrons behave in simple atoms and molecules. They will learn how symmetry can be applied in quantum mechanics and how symmetry can be used in quantum mechanics to make the problem simpler. They will also learn the application of quantum mechanics to the interaction of light with matter in spectroscopic techniques. In the lab portion of this course, the student will use spectroscopy to obtain information about certain molecules such as bond lengths and bond energies. Upon completion of this course, the student should have a better appreciation of the application of theory to experimental techniques.

V. Unless otherwise stipulated in this master syllabus by the department, the following items are subject to faculty discretion as described in each faculty member's individual course outline/syllabus:

- a) Course Requirements? (grading/evaluation procedures; class attendance policy; term papers, projects, field assignments; examinations; class participation, etc.)

The course is graded based on the student's performance on the weekly problem sets, in-class exams, performance in the lab, quality of lab reports, and the final exam.

- b) Required Text(s)?

Levine, Ira *Physical Chemistry*, 5th ed. McGraw Hill, New York **2002**

- b) Bibliography?

Department Head Signature/Date:

Signature

_____/_____/_____
Date