Syllabus (two pages):
PHYS 514 – Statistical Physics, Spring 2015
Class: TR, 9:30 am – 10:45 am, Science Building, Room 123

Instructor: **Dr. Carlos A. Bertulani**, Office Science Bldg-140, Phone 886-5882
Office hours: TR 12:30 - 1:45 pm
e-mail: carlos.bertulani@tamuc.edu
http://faculty.tamuc.edu/cbertulani/

Textbook: Elementary Statistical Physics (Dover Books on Physics, 2004) by Charles Kittel, ISBN-10: 0486435148, ISBN-13: 978-0486435145

Catalog Description: Three semester hours. A course designed to introduce students to statistical physics and its applications. Depending on time available as the course progresses, we will cover all chapters of the book.

Examination There will be 2 tests, plus a comprehensive final covering all course material. The tests will consist of questions selected from problems at the end of each chapter of the textbook. Each test counts toward 30% of the final score. The comprehensive final will be 40% of the final score.

Pre-requisites This course requires a basic knowledge of classical mechanics, namely, the Newton formulation of mechanics and of basic electromagnetism and thermodynamics from introductory physics courses.

Grades: 90% or above on final average is an "A", 80-89% = "B", etc.

Goals and Learning Outcomes for this Course

This course is an introduction to statistical physics, without which one is absolutely unable to understand modern science. It covers the topics which are used to predict and use the behavior of many-body systems. It has numerous applications to several areas of science. It covers the topics of statistical ensembles, relation to thermodynamics, fluctuations, transport equations, interaction between atoms and molecules and non-equilibrium systems. The course also develops a good knowledge in mathematical physics.

Goal 1: Students will understand the discipline-specific knowledge in statistical physics.

Objective 1: Students will know the concepts of thermodynamics and statistics and demonstrate a proficiency in the fundamental concepts in this area of science.

Objective 2: Students will be able to explain concepts of thermodynamics and statistics and to show a working knowledge of a broad array of physical phenomena that are based upon fundamental concepts of many-body interacting systems.

Goal 2: Students will have strong physical reasoning and problem solving skills and apply these skills to the solution of theoretical and applied problems.

Objective 1: Students will be able to solve problems using their knowledge and skills in modern physics. They will use critical thinking skills to formulate and solve quantitative problems in applied physics.

Objective 2: This course will offer a curriculum emphasizing physical science to produce professionals capable of applying broad theoretical insight to solution of practical problems**.**

Assessment

The following measures will be used to assess the success of this course in achieving the above objectives:

Student Work: exams.

- The course will have 2 midterm tests, plus a comprehensive final covering all course material.

- The total grade will consist of written exams.

  A typical exam question is shown below. Expect 5 of similar questions in each midterm exam, and 8 in the final exam.

  "*A classical ideal gas occupying a volume V has a mean number density n = N/V. Using the grand canonical distribution show that the probability to find N particles in the volume is given by a Poisson distribution.*"

Student Perception Survey: to determine whether students believe that they have achieved the objectives of the Physics Graduation.

- This survey will be developed in the Spring of 2015, and administered to students at the end of the semester.

- If students have concerns about the classroom experience during the semester they should inform the instructor of those concerns and failing a satisfactory response may, as a last resort, contact the physics department head with those concerns.

Students with Disabilities and Non-discrimination Compliance

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities.

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