**COURSE OUTLINE PHYSICS 431**

**Thermal and Statistical Physics**

**Birzeit University Fall Semester 21/22**

Instructor: Prof. Wael I. Karain

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Time and Location: TR 2:15-3:30. Sci 215

Course Description: Statistical description of systems of particles; statistical thermodynamics with application to macroscopic thermodynamics, foundations of statistical mechanics with applications, quantum statistics and ideal gases, kinetic theory and transport phenomena.

Prerequisite: PHYS232

Textbook: An Introduction to Thermal Physics (1st. edition). Daniel Schroeder.

Course Structure: This course will be delivered as two 75 minute lectures. Each lecture will contain discussion of the material covered, and some problem solving in class.

Student Learning Objectives: Statistical and thermal physics include powerful techniques that help us to deal with systems with large number of particles and how they behave in the context of thermal phenomena in general. By the end of this course, you will be able to answer questions about systems ranging from atoms to stars. You will achieve these goals by attending class, turning in your assignments on time, and seeking help if you do not understand something that is covered in the lectures. **Procrastination is our biggest enemy!**

Topic Outline/ Syllabus: Chapter 1: Energy in Thermal Dynamics; Chapter 2: The Second Law; Chapter 3: Interactions; Chapter 4: Engines and Refrigerators; Chapter 5: Free Energy; Chapter 6: Boltzmann Statistics; Chapter 7:Quantum Statistics; Chapter 8: Interacting systems.

Grading Policy:

1. Homework and Classwork: 20%
2. First Hour Exam: 20%
3. Second Hour Exam: 20%
4. Final Exam: 40%

Homework Policy: Homework problems will be assigned at least once a week, and should be turned in exactly on time. **No late work will be accepted**.

Course Policies: You are expected to attend each lecture on time. You are also expected to participate in class discussions. While it is encouraged that you cooperate with your colleagues, you are expected to turn in your own work. The academic honesty policies at Birzeit University will be strictly enforced.

**Good Luck**