Course Title	Course Code	Number of Study Hours			Year	Level	Prerequisites
		Theoretical	Laboratory	Credit			
Statistical Physics	353PHYS	2	---	2	3th	8th	222PHYS 301STAT

(1) Brief Course Description

Statistical Physics is a probabilistic approach to equilibrium properties of systems with large number of degrees of freedom. Topics include: introduction to statisticsl methods, statistical description of systems of particles (Methodology of Statistical Mechanics), classical statistical mechanics, and quantum statistical mechanics (Bose-Einstein and Fermi-Dirac Statistics).

(2) Course Objectives

This course is designed to provide students with:

- Introduction to statistical methods based on the probability theory.
- Statistical description of systems of particles
- Classical statistical ensembles (microcanonical, canonica, grand canonical)
- Introduction to the quantum statistical mechanics

(3) Course Contents

- **Introduction to statistical methods:** Random walk and binomial distribution.
- **Statistical description of systems of particles** (Methodology of Statistical Mechanics)**:**Statistical Micro and Macro states, and Motion of a particle in a box (Classical and Quantum approaches)**.**
- **Classical Statistical Mechanics:** Ideal gas theory (Boltzmann-Maxwell distribution)**,** Micro-canonical Ensemble**,** Canonical Ensemble**,** and Grand-canonical Ensemble**.**
- **Quantum Statistical Mechanics**: Bose-Einstein, Fermi-Dirac Statistics, and Black body radiation.

(4) Assessment Criteria

- Periodic Exams: 20%
- Oral, Student Activity and Essay: 30%
- Final Exam: 50%

(5) Course Teaching Strategies

- Lectures, Reports and Essay Assignments, Homework, and Web-based Assignments.

(6) Text Book

- Fundamentals of Statistical and Thermal Physics ; F. Reif, McGraw–Hill, 2002.

(7) Reference Books

- Thermodynamics, Kinetic Theory and Statistical Thermodynamics; F.W. Sears and G. L Salinger, John Wiley& Sons, Inc., 1975.
- Introduction to Statistical Physics, W. G. Rosswe, Ellis Horwood, Ltd. 1982

Approved by:

Head of Physics Department

Dr. Hussain Alathlawi