Jordan University of Science and Technology
Faculty of Science & Arts
Physics Department

PHY461 Statistical Mechanics - JNQF Level: 7
Second Semester 2023-2024

Course Catalog
3 Credit Hours. PHYSICS 461 COURSE OUTLINE Statistical Physics PHY 461 Text: Introduction to Statistical Physics by A. J. Pointon. References: Fundamentals of Statistical and Thermal Physics by F. Reif Instructor: Prof. M.K. Qaseer Office: PH3L1 EVALUATION: First Exam 20%, Second Exam 20%, Homework and Quizzes 20% Final Exam F0% (comprehensive). Webpage: http://www.just.edu.jo/~qaseer E-mail: qaseer@just.edu.jo Homework: will be given on a separate sheet (Check the E-Learning). The homework assignments will be due to the beginning of class. No homework will be accepted after that. WEEK # TOPIC 1 Chapter 1: Introduction 2 Chapter 2: Maxwell-Boltzmann Statistics 3-4 Chapter 3: Applications of Maxwell-Boltzmann Statistics 5-6 Chapter 4: Bose-Einstein Statistics 6-7 Chapter 5: Fermi-Dirac Statistics 8 Chapter 6: Temperature and Entropy 9 Chapter 7: The Thermodynamics of Gases 10 Chapter 8: Applications of Statistical Thermodynamics 11-12 Chapter 9: The Canonical Ensemble 13-14 Chapter 10: The Grand Canonical Ensemble

Teaching Method: On Campus

Text Book	
Title	Introduction to Statistical Physics
Author(s)	A. J. Pointon
Edition	1st Edition
Short Name	1
Other Information	

Course References

Short name	Book name	Author(s)	Edition	Other Information
2	Fundamental of Statistical and Thermal Physics	F. Reif	1st Edition	

Instructor	
Name	**Prof. Mohammad-Khair Qaseer**
Office Location	PH4 L-1
Office Hours	

Email	qaseer@just.edu.jo

Class Schedule & Room

Section 1:
 Lecture Time: Sun, Tue, Thu : 11:30 - 12:30
 Room: CIS01- PH3 L-1

Prerequisites

Line Number	Course Name	Prerequisite Type
922611	PHY261 Thermodynamics	Prerequisite / Pass
923511	PHY351 Quantum Mechanics(1)	Prerequisite / Pass

Tentative List of Topics Covered

Weeks	Topic	References
Week 1	Chapter 1: Introduction and Random Walk Problem	**Random Walk Problem** From **2**
Week 2	Chapter 2: Maxwell-Boltzmann Statistics	
Weeks 3, 4	Chapter 3: Applications of Maxwell-Boltzmann Statistics	
Weeks 5, 6	Chapter 4: Bose-Einstein Statistics	
Weeks 7, 8	Chapter 5: Fermi-Dirac Statistics	
Week 8	Chapter 6: Temperature and Entropy	
Week 9	Chapter 7: The Thermodynamics of Gases	
Week 10	Chapter 8: Applications of Statistical Thermodynamics	
Weeks 11, 12	Chapter 9: The Canonical Ensemble	
Weeks 11, 12	Chapter 9: The Canonical Ensemble	
Weeks 13, 14	Chapter 10: The Grand Canonical Ensemble	

Mapping of Course Outcomes to Program Outcomes and NQF Outcomes	Course Outcome Weight (Out of 100%)	Assessment method
To learn the microcanonical ensembles and apply classical distributions [2SLO1(K1S1)] [1L7K1, 1L7S1]	26%	First Exam, Homework and quizzes
To learn Bose-Einstein and Fermi-Dirac distributions [2SLO1(K1S1)] [1L7K1, 1L7S1]	26%	Second Exam, Homework and quizzes

To learn Thermodynamics of gases from statistical prospective and learn canonical and grand canonical ensembles. [3SLO1(K1S1)] [1L7K1, 1L7S1]	48%	Homework and quizzes, Final Exam

Relationship to Program Student Outcomes (Out of 100%)					
SLO1(K1S1)	SLO2(S23C1)	SLO3(C24)	SLO4(C3)	SLO5(C4)	SLO6(S2C3)
100					

Relationship to NQF Outcomes (Out of 100%)	
L7K1	L7S1
50	50

Evaluation	
Assessment Tool	**Weight**
First Exam	20%
Second Exam	20%
Homework and quizzes	20%
Final Exam	40%

Policy	
Physics 461	We will cover the book (10 Chapters) + different parts from reference 2 The student performance consists of a midterm exam, final exam, quizzes, and homework. The student must submit homeworks on time no excuse will be given.

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