



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

PHY461 Statistical Mechanics - JNQF Level: 7

Second Semester 2024-2025

**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](mailto: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**

<b>Title</b>	Introduction to Statistical Physics
<b>Author(s)</b>	A. J. Pointon
<b>Edition</b>	1st Edition
<b>Short Name</b>	1
<b>Other Information</b>	

**Course References**

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

**Class Schedule & Room**

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	<b>Random Walk Problem From 2</b>
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%	
To learn Bose-Einstein and Fermi-Dirac distributions [2SLO1(K1S1)] [1L7K1, 1L7S1]	26%	
To learn Thermodynamics of gases from statistical prospective and learn canonical and grand canonical ensembles. [3SLO1(K1S1)] [1L7K1, 1L7S1]	48%	

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

<b>Evaluation</b>	
<b>Assessment Tool</b>	<b>Weight</b>
First Exam	20%
Second Exam	20%
Homework and quizzes	20%
Final Exam	40%

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

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