هيئة تقويم التعليم والتدريب
Education & Training Evaluation Commission

T-104
2022

Course Specification

Course Title:	**Statistical Physics**
Course Code:	**353 PHYS**
Program:	**Physics**
Department:	**Physics**
College:	**Science College**
Institution:	**Jazan University**
Version:	**2020**
Last Revision Date:	**13/04/1444**

Table of Contents:

A. General information about the course:

Course Identification					
1. Credit hours:	2				
2. Course type					
a.	University ☐	College ☐	Department☒	Track☐	Others☐
b.	Required ☒	Elective☐			
3. Level/year at which this course is offered: 8					
4. Course General Description Statistical Physics is a probabilistic approach to equilibrium properties of systems with large numbers of degrees of freedom. Topics include an introduction to statistical methods, statistical description of systems of particles (Methodology of Statistical Mechanics), classical statistical mechanics, and quantum statistical mechanics (Bose-Einstein and Fermi-Dirac Statistics).					
5. Pre-requirements for this course (if any): 222 PHYS					
6. Co- requirements for this course (if any): 301 STAT					
7. Course Main Objective(s) **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 (micro-canonical, canonical, grand canonical) - Introduction to the quantum statistical mechanics					

1. Teaching mode (mark all that apply)

No	Mode of Instruction	Contact Hours	Percentage
1.	Traditional classroom	20	91
2.	E-learning		
3.	Hybrid ● Traditional classroom ● E-learning	2	9
4.	Distance learning		

2. Contact Hours (based on the academic semester)

No	Activity	Contact Hours
1.	Lectures	22
2.	Laboratory/Studio	

3.	Field	
4.	Tutorial	
5.	Others (specify)	
	Total	22

B. Course Learning Outcomes (CLOs), Teaching Strategies and Assessment Methods

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
1.0	Knowledge and understanding			
1.1	**Describe** the statistical nature of concepts and laws in thermodynamics,	1.1	Lectures, discussion	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams. **Indirect:** student survey
1.2	**Define** statistical function, such as Boltzmann distribution, Fermi-Dirac and Bose-Einstein distributions to solve problems in some physical systems	1.1	Lectures, discussion	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams. **Indirect:** student survey
1.3	**Explain** the fundamental postulates of statistical mechanics	1.2	Lectures, discussion	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams. **Indirect:** student survey
2.0	Skills			
2.1	**Calculate** statistical properties for systems such as gasses, solids, photons, or vibrations.	2.1	Lectures, discussion	**Direct** (formative and summative): In class interactive

Code	Course Learning Outcomes	Code of CLOs aligned with program	Teaching Strategies	Assessment Methods
				questioning, quizzes, written exams. **Indirect:** student survey
2.2	**Compare** between statistical laws of classical particles, bosons, and fermions	2.2	Lectures, discussion	**Direct** (formative and summative): In class interactive questioning, quizzes, written exams. **Indirect:** student survey
2.3	**Develop** communication and critical thinking competencies during interactive discussion, group assignments, essays, or web-based activities	2.4	Discussion	**Direct:** In class interactive questioning, quizzes, written exams. **Indirect:** student survey
3.0	Values, autonomy, and responsibility			
3.1	**Develop** skills of group working in group assignments and discussion and bear individual responsibility in the assigned tasks	3.1	Discussion	**Direct**: In class interactive questioning, quizzes, written exams. **Indirect:** student survey

C. Course Content

No	List of Topics	Contact Hours
1.	Introduction to Statistical Physics	3
2.	Statistical description of systems of particles (Methodology of Statistical Mechanics)	7
3	Classical Statistical Mechanics	7
4	Quantum Statistical Mechanics	5
Total		22

D. Students Assessment Activities

No	Assessment Activities *	Assessment timing (in week no)	Percentage of Total Assessment Score
1.	Class Activities (Homework, quizzes, assignments)	Over the semester	30
2.	Mid-term exam	7	20
3.	Final Exam	13	50

*Assessment Activities (i.e., Written test, oral test, oral presentation, group project, essay, etc.)

E. Learning Resources and Facilities

1. References and Learning Resources

Essential References	Fundamentals of Statistical and Thermal Physics; F. Reif, McGraw– Hill, 2002
Supportive References	- 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
Electronic Materials	http://www.hazemsakeek.com/
Other Learning Materials	

2. Required Facilities and equipment

Items	Resources
facilities (Classrooms, laboratories, exhibition rooms, simulation rooms, etc.)	Classroom
Technology equipment (Projector, smart board, software)	Smartboard, Blackboard
Other equipment (Depending on the nature of the specialty)	None

F. Assessment of Course Quality

Assessment Areas/Issues	Assessor	Assessment Methods
Effectiveness of teaching	Students, Peer and program leader	Indirect (CES)- Indirect peer evaluation
Effectiveness of students assessment	Students, Program assessment committee	Direct/ Indirect
Quality of learning resources	Students, Faculty members	Indirect
The extent to which CLOs have been achieved	Instructor	Direct/Indirect
Other		

Assessor (Students, Faculty, Program Leaders, Peer Reviewer, Others (specify)

Assessment Methods (Direct, Indirect)

G. Specification Approval Data

COUNCIL /COMMITTEE	DEPARTMENT BOARD
REFERENCE NO.	PHYS2304
DATE	28/2/2023