Course Specifications

Programme(s) on which the course is given : P., P.&las., P.&G., P.&Ch.

Major or Minor element of programmes : major -minor - minor -minor

Department offering the programme : P., P., P.&G., P.&Ch.

Department offering the course Physics

Academic year / Level 2

Date of specification approval 2012

A- Basic Information

Title:	**Statistical thermodynamics**	**Code: P222**
Credit Hours:	**3 h**	**Lecture: 3h**
Tutorial: 00	**Practicals:00**	**Total: 3h**

B- Professional Information

1 – Overall Aims of Course

at the end of this course the student should be able to understand the different types of thermodynamics systems that can used to interpret many physical phenomena like blackbody radiations and some experimental and industrial applications.

2 – Intended Learning Outcomes of Course (ILOs)

a Knowledge and Understanding:

The student should be able to

a1- understand the basic behavior of particle and molecules

a2- Explain distributions of particles in different levels

a3- Interpret why that different particles belongs to different systems and their energies

b Intellectual Skills

The student should be able to

b1- understand the principles of many systems

b2-understand the distribution of participle at low temperatures

b3- determine the molecular energies

c Professional and Practical Skills

the student should be able to

c1- set up experiments and models for electrons, photons, and molecules .

c2- determine the allowed energy levels on molecules

c3- discuss the theories and test them in many systems

d General and Transferable Skills

the student should be able to

d1- compare the behavior of small particles and very large objects

d2- understand the importance of statistical methods in our daily life

d3- acquire proper behavior inside the univesity as one example of different systems in our society

3- Contents

Topic	No. of hours	Lecture	Tutorial/Practical
Thermodynamic system	3	1	
Particles and molecules	3	1	
Energy levels and energy states	3	1	
System at equilibrium	6	1	1

Boltzman distribution	**3**	**1**	
partition function	**6**	**1**	
Fermi- Dirac distribution law	**3**	**1**	
Bose-Einstein distribution law	**3**	**1**	
Perfect gases – black body radiation and photons	**6**		**2**
Entropy and thermodynamic parameters	**3**	**1**	

4– Teaching and Learning Methods

4.1- lectures

4.2- exercises to solving problems

5- Student Assessment Methods

5.1-discussion to assess learning skill

5.2- exersises to assess knowledge skills

5.3- written exam to assess comprehension

Assessment Schedule

Assessment 1 mid term exam
Week 6
Assessment 2 semester activities
Week 8, 11
Assessment 3 final term exam
Week 13

Weighting of Assessments

Mid-Term Examination 20 %
Final-term Examination 60 %

Semester Work	**20 %**
Total	**100 %**

6- List of References

6.1- Course Notes

6.2- Essential Books (Text Books)

fundamental university physics vol. III Quantum and statistical physics M. Olonso, E.J. Finn Wesley publishing company 1980.

6.3- Recommended Books

concepts of modern physics Beiser. A McGraw Hill 1990.

Thermodynamics, Kinetic theory and statistical Thermodynamics by S. Sears (Adeson Wesely publishing company) 1976.

6.4- Periodicals, Web Sites, … etc

7- Facilities Required for Teaching and Learning

Computers, data show, experimental instrumentation and internet facility

Course Coordinator: Prof.Dr.Zakaria El Badawy

Head of Department: Prof.Dr. Sanaa Maize

Date: / /