Course Specifications

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

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

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

Department offering the course Physics

Academic year / Level 2

Date of specification approval 2012

A-Basic Information

Title:	**Atomic physics(2)**	**Code: P237**
Credit Hours:	**3 h**	**Lecture: 3h**
Tutorial:00	**Practicals:00**	**Total: 3h**

B- Professional Information

1 – Overall Aims of Course

at the end of the course, the student should be able to understand the atomic structure according to quantum mechanical treatment to compare the quantum mechanical treatment with the old quantum theory or semi-classical treatment given by Bohr

2 – Intended Learning Outcomes of Course (ILOs)

a-Knowledge and Understanding:

By studying this course the student should be able to

a1- understand the basic ideas about atomic structure

a2- write the complete mathematical solution of Schrödinger equation as applied to H-atom

a3- understand uses of the basic quantum mechanical techniques to atomic structure

b-Intellectual Skills

By studying this course the student should be able to

b1-compare the roles of semi-classical theory with quantum mechanical concepts
b2- apply quantum mechanics concepts to real world of atomic structure
b3- summarize the different theories deals with atomic structure

c-Professional and Practical Skills

c1- weight the outcomes of the course through its applications to
describe the production of X-ray and the operation of laser
c2- set a program of exercises based on the tools he learned in the course
c3- the student should be able to use appropriate equipments and tools in the field of atomic physics

d-General and Transferable Skills

d1- the student should be able to write reports or essay
d2- the student should be able to present reports in group meeting
d3- the student should be able to find solutions for work problems
d4- download online data from the net

3- Contents

Topic	No. of hours	Lecture	Tutorial/Practical
Semi-classical (Bohr)model	3	2	1
Introduction to wave mechanics	3	2	1
Hydrogen atom Schrödinger wave equation	3	2	1
The physical significance of quantum numbers	3	2	1
The electron's spin	3	2	1
The angular momentum of the electron in H-atom	3	2	1
The spin-orbit interaction	3	2	1
The normal Zeeman effect	3	2	1
The anomalous Zeeman effect	3	2	1
The experimental evidence of electron spin	3	2	1
The spectrum of many electron atom	3	2	1
total	33	22	11

4– Teaching and Learning Methods

4.1- lectures

4.2 – working on hand in assignments

5- Student Assessment Methods

5.1 mid term written exam to assess the understanding competencies
5.2-oral exam to assess attendance and interesting .
5.3 final exam to assess comprehension

Assessment Schedule

Assessment 1 mid term written exam Week 5-6
Assessment 2 semester activities week 1-12
Assessment 3 final term oral exam week 13
Assessment 4 final term written exam week 14

Weighting of Assessments

Mid-Term Examination	
20	**%**
Final-term Examination	
60	**%**
Oral Examination.	
20	**%**
Total	**100 %**

6- List of References

6.1- Course Notes
Course notes cover the main topics in the course content .
6.2- Essential Books (Text Books)
Essential text books under the title introduction to atomic physics or to modern physics
Downloaded related topics from the net
Recommended Books

6.3- Periodicals, Web Sites, … etc

7- Facilities Required for Teaching and Learning

Lecture classes – overhead projector- data show

Course Coordinator: Dr.Abdel Aziz Habib **Head of Department: Prof.Dr. Sana Maize** **Date: / /**