Course Specifications

Program (s) on which the course is given: Physics, Physics & Laser Sciences, Physics and computer science, and Physics & chemistry.
Major or Minor element of program: major.
Department offering the program: Physics
Department offering the course: Physics
Academic year / Level: 1
Date of specification approval: 2012

A- Basic Information

Title: Atomic Physics (1) Code: P133
Credit Hours: 3 h Lecture: 3h
Tutorial: 00 Practical: 00 Total: 3h

B- Professional Information

1 – Overall Aims of Course:

By the end of the course, the student should be able to understand the general concepts used in atomic physics. Also the student should be able to know the difference between the old atom models.

In addition, the student should be able to understand some new concepts of modern physics by studying Bohr model of the atom with the relating topics.

Many practical examples relevant to the design and application of laser-interaction with matter will be included.

2– Intended Learning Outcomes of Course (ILOs)

a) Knowledge and Understanding:

The student should be able to:

a.1- Know the difference between photon theory and wave theory of ordinary light.

a.2- Understand the different models of the atom.

a.3- Understand and interpret the general atom characters.

b- Intellectual Skills

The student should be able to:

b.1- Analysis of atom models.

b.2- Classify the different atom models leading to the most recent model.

b.3- Identify the points of valuable strength in atomic physics.

c- Professional and Practical Skills

The student should be able to:

c.1- Solve problems of varying difficulty using suitable mathematical rules.

c.2- Differentiate between different models.

c.3- Design and perform experiments in laboratory.

d- General and Transferable Skills

d.1- Using computer and internet

d.2- Work in team and make discussions

d.3- Enhance writing ability of assigned reports

d.4- Work in groups and enhance oral communications

3- Contents

Topic	No. of hours	Lectures	Tutorial/Practical
I- Introduction and definition of the new concepts of modern physics.	**6**	**2**	**0**
- Heisenberg uncertainty principle	**2**		
- Duality principle	**2**		
- De Broglie principle	**2**		

- Problems			
II- Photon theory of EM radiation **- BB radiation** **- Photoelectric effect** **- X-Ray spectrum (line and continuous)** **- Compton scattering**	**2** **2** **2** **2**	**3**	**0**
III- Old Atom Models **- Thomson model** **- Rutherford Experiment** **- Classical Planetary**	**2** **2** **2**	**3**	**0**
IV- Introduction to New Atom Models **- Bohr model** **- Sommerfielfd** **- Hydrogen spectrum** **- Problems**	**3** **3** **3** **3** **2**	**6**	**0**

4– Teaching and Learning Methods

4.1- Lectures using data show (if available)

4.2- Using white board

4.3- Reports

5- Student Assessment Methods

5.1 Oral to assess understanding

5.2 Written exams to assess investigation, and derivations.

5.3 Report to assess scientific review.

5.4- Sheet exam-week 8&14 (mid &final exam)

Assessment Schedule

Assessment 1: Mid-term and final axam (7th and 14th week)
Assessment 3: Oral exams- every week
Assessment 4: Research report exam- last week

Weighting of Assessments

Mid-Term Examination	**20 %**
Final-term Examination	**60 %**
Oral Examination.	**10 %**
Semester Work	**10 %**
Total	**100 %**

6- List of References

6.1- Atomic Physics (Oxford Master Series in Atomic, Optical and Laser Physics) Christopher J. Foot.

6.2- Atomic physics: An exploration through problems and solutionsby Dmitry Budker, Derek Kimball and David DeMille (Nov 15, 2008).

6.3- Atomic Physics by Max Born.

7- Facilities Required for Teaching and Learning

Advanced data show, Good screen, Comfortable disks for students.

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