

Planning and Quality Assurance Affairs

Form (A)

Course Specifications

General Information

Course name	Modern Physics
Course number	PHYS2309
Faculty	
Department	
Course type	College Needs
Course level	2
Credit hours (theoretical)	3
Credit hours (practical)	0
Course Prerequisites	

Course Objectives

- 1 - 1- Understanding the basic principles of special relativity and elementary quantum mechanics and the regimes in which the different theories apply. 2- Applying these principles in conjunction with elementary mathematical techniques to solve simple problems in classical, relativistic and quantum mechanics. Finding and Understanding a solution to a physics problem in a clear and logical written for
- 2 - Understanding the particle nature of electromagnetic radiation
- 3 - Understanding the wave properties of material and de-Broglie hypothesis
- 4 - Understanding the history of atoms, atomic models and hydrogen atom spectral ligh

Intended Learning Outcomes

General Skill	* Shows how the new ideas developed and paradoxes that forced thinking out of the traditional path. learn a process for critical thinking, and apply it to evaluate physical theories. Use these techniques to understand the ideas underlying modern physics. know basic concepts of special relativity, and of Schrödinger's quantum mechanics. Realize where physics is today, and where it is going
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Course Contents

- 1 - Special Relativity: Galilean Relativity, The speed of light, Michelson-Morely Experiment, Time dilation and length contraction, The Lorentz Transformations, Relativistic dynamics, Equivalence
- 2 - Electromagnetic Radiation: Thermal radiation, Black body radiation, Plancks Quantum hypothesis
- 3 - Photons and Wavelength: Photoelectric effect, Einsteins Formula, Plancks constant, Compton effect, X-Ray production and spectroscopy, Bragg's Law
- 4 - Waves and Particles: de-Broglies hypothesis, Electron diffraction, Wave and group velocities, Heisenbergs "Uncertainty Principle", Probability concept
- 5 - The Atomic Models: Thomson Model, Rutherford, Bohr Model, Atomic Spectra
- 6 - Elements of Quantum Mechanics: Postulates of Quntum Mechanics, Schrodinger equation, Wave function of free particles, potential well

Teaching and Learning Methods

- 1 - The course is given as: 1.Lectures.2- Class tutorials. 3- Power point
- 2 - Several problems on the material are solve at the end of each unit
- 3 - In addition some assignments are given to the students as a homework

Students Assessment

<u>Assessment Method</u>	<u>TIME</u>	<u>MARKS</u>
First Hour Exam	6th Week	20%
Second Hour Exam	12th Week	20%
Homework and Seminars	Through the Semester	10%
Final Exam	17th Week	50%

Books and References

Essential books	Modern Physics, P. Tipler & R. Llewellyn, 5th edition,2008
Recommended books	Modern Physics An Introductory Text, Pfeffer & Nir
	Introduction to Atomic & Nuclear Physics, Semat & Albright
	Physics for Scientists& Engineering, Serway & Beichner