K.T. Govt. College Ratia (Fatehabad)

Lesson Plan (Odd Semester) Session 2023-24
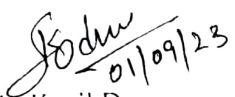
Name of the Assistant Professor: - **Mr. Kapil Dev**

Class: B.Sc. III Year (Sem. 5TH)

Subject and Paper: Physics (Nuclear Physics)

Period	Subject Topic	Remarks
24 July to 31 July	**Unit-I** Introduction of the syllabus Nuclear Structure and Properties of Nuclei. Nuclear size, spin, parity, statistics, magnetic dipole moment, quadruple moment (shape concept). Mass and binding energy. Binding energy curve and nuclear stability.	
01 Aug to 15 Aug	Determination of size of nuclei by Rutherford back scattering. Determination of mass by Bain-Bridge. Bain-Bridge and Jordan mass spectrograph. Determination of charge by Mosely law. Nuclear radiation decay processes.	Unit Test
16 Aug to 31 Aug	**Unit-II** Alpha-disintegration and its theory. Energetic of alpha decay. Origin of continuous beta spectrum (neutrino hypothesis). Types of beta-decay. Energetic of B-decay. Nature of gamma rays and energetic of gamma rays. Radiation interaction interaction of heavy charged particles (Alpha particles).	
01 Sept to 15 Sept	Energy loss of heavy charged particle (idea of bethe formula, no derivation). Range and straggling of alpha particles. Geiger-Nuttal law. Interaction of light charged particle (Beta-particle). Energy loss of beta-particles (ionization). Range of electrons, absorption of beta-particles. Interaction of Gamma rays Passage of gamma radiations through matter.	
16 Sept to 30 Sept	Photoelectric, Compton and pair production effect. Electron-positron annihilation. Absorption of gamma rays (Mass attenuation coefficient) and its application. Absorption of gamma rays (Mass attenuation coefficient) and its application.	Unit Test
01 Oct to 15 Oct	**Unit-III** Nuclear Accelerators Linear accelerator. Tandem accelerator. Cyclotron and betatron accelerators. Nuclear radiation detectors gas filled counters. Ionization chamber. proportional counter. G.M. counter (detailed study). Scintillation counter & semiconductor detector.	Unit Test

16 Oct to 31 Oct	**Unit-IV** Nuclear reactions. Elastic scattering. inelastic scattering. Nuclear disintegration. photonuclear reaction. Radioactive capture. Direct reaction. Heavy ion reactions and spalation reactions.	
01 Nov to 15 Nov	Conservation laws. Q-value and reaction threshold. Nuclear Reactors.	
16 Nov to 30 Nov	General aspects of reactor design. Nuclear fission and fusion (Principle. construction. working and use).	Unit Test
01 Dec to 10 Dec	Revision	

01/09/23.

Mr. Kapil Dev
Assistant Professor
Department of Physics
K. T. Govt. College. Ratia.

9/2023

Principal
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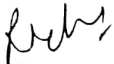# Lesson Plan (Odd Semester) Session 2023-24

Name of the Assistant Professor: - Dr. Richa Rani
Class: - B.Sc 3rd Year (5th-Sem.)
Subject: - Physics

Period	Topics to be covered	Topic of Assignments / Tests to be given to the students
24 July to 31 July	**Unit 1: Origin Quantum Physics** Quantum Mechanics- Overview, scale of quantum physics, boundary b/w classical and quantum mechanics, Photoelectric effect and Compton effect theory and result.	
01 Aug. to 15 Aug.	De-Broglie hypothesis, Davission and Germer experiment, Phase and group velocity and their relation, Heisenberg uncertainty principle, Time energy and angular momentum, Wave-particle duality, Gamma ray microscope.	
16 Aug. to 31 Aug.	Derivation of Time Dependent Schrodinger wave equation, Derivation of Time-Independent Schrodinger wave equation (eigen value, eigen function and their function, Orthogonality and Normalization of function, Concept of observer and operator, Expectation value of dynamical quantities, probability current density.	Unit Test
01 Sept. to 15 Sept.	**Unit 2: Applications of Schrodinger Wave Equation** Application of S.W.E. Free particle in one dimensional box(Solution of SWE, eigen function, eigen values, nodes and antinodes) One dimensional step potential $E > V_0$ (Reflection and Transmission Coefficient), One dimensional step potential $E < V_0$ (penetration depth calculation).	
16 Sept. to 30 Sept.	One dimensional step potential barrier $E > V_0$ (Reflection and Transmission Coefficient), One dimensional step potential barrier $E < V_0$ (penetration or tunnelling coefficient), SWE for Harmonic Oscillator: Zero point energy, Wave equation for ground and excited states.	Unit Test
01 Oct. to 15 Oct.	**Unit 3: Laser Physics-I** Absorption and Emission of Radiation, Main feature of Laser,	

16 Oct. to 31 Oct.	Einstein coefficient and possibility of amplification, momentum transfer and life time of a level.		
	Fuchbauer landerburg formula, line shape function, Line broadening mechanism population inversion, Laser pumping, Threshold condition for laser emission.	Unit Test	
01 Nov. to 15 Nov.	**Unit 4: Laser Physics- II**		
16 Nov. to 30 Nov.	He-Ne laser (Principle, construction and working) Ruby Laser (Principle, construction and working).		
	Properties of Semiconductor, Semiconductor Laser (Principle, construction and working). Application of the laser in the field of medicine and industry.	Unit Test	
01 Dec. to 10 Dec.	Revision		

Dr. Richa Rani
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Department of Physics
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