



**Maharaja Surajmal Brij University**

**Bharatpur (Rajasthan)**

**Syllabus**

**Multidisciplinary Course**

**Subject: Physics**

**Semester – V**

  
प्रभारी अकादमिक प्रथम

**Semester: V**  
**MDC- PHYSICS**  
**Applied Physics (Multidisciplinary Course)**  
**Course Code: MDC-PHY-20T-3001**  
**Level: Undergraduate (UG)**

**Total Credits: 04**

**Total Teaching Hours: 60**

**Course Objectives**

- To introduce fundamental concepts of Physics in an applied and interdisciplinary context.
- To develop scientific temperament and analytical thinking.
- To demonstrate the application of physics in technology, environment, and healthcare.
- To build experimental and problem-solving skills.

**Learning Outcomes**

- After completing the course, students will be able to:
- LO1: Understand fundamental principles of physics and their applications.
  - LO2: Apply physical laws to solve real-life problems.
  - LO3: Analyze data using basic experimental and computational techniques.
  - LO4: Relate physics concepts to interdisciplinary domains (biology, environment and engineering).

**Assessment Methods**

- A. Continuous Assessment (CA) – 20%
  - B. End of Semester Examination (EoSE) – 80%
- Written examination (theory-based + application-oriented questions)

**Unit I: Basics of Physics, Properties of Matter and Thermodynamics**

**(15 Hours)**

- Units and dimensions
- Vectors and motion
- Newton's laws of motion
- Work, energy, and power
- Conservation laws
- Skill Focus: Problem-solving, analytical thinking
- Elasticity and viscosity
- Surface tension
- Heat and temperature
- Laws of thermodynamics
- Applications: Materials, environmental systems

**Unit II: Waves and Optics**

**(15 Hours)**

- Wave motion and sound
- Reflection and refraction
- Optical instruments
- Introduction to fiber optics
- Applications: Communication, medical diagnostics

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### **Unit III: Electricity, Magnetism and Electronics**

**(15 Hours)**

Electrostatics  
Current electricity and circuits  
Magnetism and electromagnetic induction  
Basic electronics (diodes, transistors)  
Applications: Electrical systems, electronics

### **Unit IV: Modern Physics and Interdisciplinary Applications**

**(15 Hours)**

Introduction to quantum physics  
Semiconductors  
Lasers and nuclear physics  
Physics in healthcare and environment

### **Teaching-Learning Process (TLP)**

Lectures and interactive discussions  
Demonstrations and simulations  
Case studies and field-based learning  
Project-based learning

### **Skill Enhancement Components**

Basic data analysis  
Scientific report writing  
Introduction to simulation tools  
Problem-solving using real-life scenarios

### **Suggested Projects**

Solar energy utilization  
Physics in medical instruments (X-ray, MRI)  
Environmental monitoring using sensors  
Simple electronics project

### **Suggested Readings**

Concepts of Physics – Concepts of Physics  
Fundamentals of Physics – Fundamentals of Physics  
Engineering Physics – Engineering Physics

### **Alignment with NEP 2020**

Multidisciplinary approach  
Skill-based learning  
Flexibility and choice-based credit system  
Outcome-based education (LOCF)  
Integration of theory with practical

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