

PRE-UNIVERSITY REMEDIAL PROGRAM

Physics Syllabus (**REVISED**)

Credits-

4hr

Duration: Six months (**96 hours**)

Prepared by

Alemayehu Girma (PhD)

Kotebe University of Education

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1. **Physical Quantities and Measurement(2hrs)**
 - 1.1. Scales, Standards, and Units (Prefixes)
 - 1.2. Measurement and Safety
 - 1.3. Classification of Physical Quantities
 - 1.4. Unit Conversion
2. **Vectors (2hrs)**
 - 2.1. Scalars and Vectors
 - 2.2. Vector Representations
 - 2.3. Vector Addition and Subtraction
 - 2.4. Graphical Method of Vector Addition
 - 2.5. Vector Resolution
 - 2.6. Product of Vectors
3. **Motion in One and Two Dimensions(10hrs)**
 - 3.1. Position, Distance, and Displacement
 - 3.2. Average Speed and Instantaneous Speed
 - 3.3. Average Velocity and Instantaneous Velocity
 - 3.4. Acceleration
 - 3.5. Uniformly Accelerated Motion in 1D
 - 3.6. Equations of Motion with Constant Acceleration
 - 3.7. Graphical Representation of Uniformly Accelerated Motion
 - 3.8. Vertical Motion
 - 3.9. Uniform Circular Motion
 - 3.10. Projectile motion
4. **Angular motion(3hrs)**
 - 4.1. Angular Position
 - 4.2. Angular velocity
 - 4.3. Angular Acceleration
 - 4.4. Relation between linear and angular motion
5. **Dynamics (10hrs)**
 - 5.1. The Concept of Force
 - 5.2. Newton's Laws of Motion
 - 5.3. Forces of Friction
 - 5.4. Impulse and Linear Momentum (elastic and non-elastic collision)
 - 5.5. Center of mass and moment of inertia
 - 5.6. Torque and Rotational Inertia (Moment of Inertia)
 - 5.7. Rotational Kinetic Energy
 - 5.8. Angular Momentum and Its Conservation
 - 5.9. Equilibrium of Rigid Bodies
6. **Work, Energy, and Power(8hrs)**
 - 6.1. Work done by constant and variable forces
 - 6.2. Conservation of energy
 - 6.3. Work energy theorem
 - 6.4. Conservative forces
 - 6.5. Power
7. **Fluids and Pressure(6hrs)**
 - 7.1. Definition of Pressure and Its Units

- 7.2. Pressure in Liquids (Pascal's Principle)
- 7.3. Atmospheric Pressure and Barometers
- 7.4. Buoyancy and Archimedes' Principle
- 7.5. Fluid Dynamics (Continuity Equation and Bernoulli's Principle)
- 7.6. Applications of Pascal's, Archimedes', and Bernoulli's Principles
- 8. **Simple Machines(4hrs)**
 - 8.1. Simple Machines and Their Purposes
 - 8.2. Simple Machines at Home and Workplaces
 - 8.3. Classification of Simple Machines
 - 8.4. Mechanical Advantage, Velocity Ratio, and Efficiency
 - 8.5. Designing Simple Machines
- 9. **Waves (6hrs)**
 - 9.1. Common Characteristics of Waves
 - 9.2. String, Pendulum, and Spring
 - 9.3. Propagation of Waves and Energy Transmission
 - 9.4. Sound Waves
 - 9.5. Superposition of Waves
 - 9.6. Characteristics of Sound Waves
- 10. **Temperature and Heat Transfer(6hrs)**
 - 10.1. Temperature and Our Life
 - 10.2. Extreme Temperature Safety
 - 10.3. Temperature Change and Its Effects
 - 10.4. Measuring Temperature with Different Thermometric Scales
 - 10.5. Types of Thermometers and Their Use
 - 10.6. Conversion between Temperature Scales
 - 10.7. Thermal Expansion of Materials
- 11. **Electrostatics and Electric Circuits(8hrs)**
 - 11.1. Charges in Nature
 - 11.2. Methods of Charging a Body
 - 11.3. Coulomb's Law of Electrostatics
 - 11.4. The Electric Field
 - 11.5. Electric Current, Voltage, and Ohm's Law
 - 11.6. Combination of Resistors in a Circuit
 - 11.7. Electrical Safety
 - 11.8. Electric Projects
- 12. **Magnetism and Its Applications(5hrs)**
 - 12.1. Magnet and Magnetic Field
 - 12.2. The Earth's Magnetic Field and the Compass
 - 12.3. Magnetic Field of a Current-Carrying Conductor
 - 12.4. Applications of Magnetism
- 13. **Electromagnetic Waves and Light(6hrs)**
 - 13.1. Electromagnetic (EM) Waves
 - 13.2. EM Spectrum
 - 13.3. Light as a Wave
 - 13.4. Laws of Reflection & Refraction
 - 13.5. Mirrors and Lenses
 - 13.6. Human Eye and Optical Instruments
 - 13.7. Primary Colors of Light and Human Vision

- 13.8. Color Addition and Subtraction of Light
- 14. Nuclear Physics and Radiation(5hrs)**
- 14.1. The Nucleus
 - 14.2. Radioactivity
 - 14.3. Use of Nuclear Radiation
 - 14.4. Nuclear Reactions and Energy Production
 - 14.5. Safety Rules Against Hazards of Nuclear Radiation
- 15. Basic Electronics(4hrs)**
- 15.1. Semiconductors
 - 15.2. Diodes and Their Functions
 - 15.3. Rectification
 - 15.4. Transistors and Their Applications
 - 15.5. Integrated Circuits
 - 15.6. Logic Gates and Logic Circuits
 - 15.7. Applications of Electronics

References

- High School Physics Text books (Grade 9-12)
- Serway, R. A. and Vuille, C., 2018, College Physics, 1th ed., Cengage Learning, Boston, USA
- University Physics with Modern Physics by Young, freedman and Lewis Ford
- Physics for Scientists and Engineers with Modern Physics by Douglas C. Giancoli
- Fundamentals of physics by David Halliday, Robert Resnick and Gearl Walker
- College Physics by Hugh D. Young Sears Zemansky, 9th edition

Mode of delivery

- An activity-based interactive teaching approach will be applied

Assessment

- **50% Continues assessment**
- **50% final**
- **Central exam (100%)**