Curriculum of Applied(advance) Physics (1st year) (PHYS102) 2023-2024

30 hours theory 30 hours practical

1.	**a.**	**Physics of the Cardiovascular System**	**5Hours**
	b.	**Major Components of the cardiovascular system.**	
	c.	**Work Done by the Heart .**	
	d.	**Blood Pressure and Its Measurement .**	
	e.	**Pressure Across the Blood Vessel Wall(Transmutabl Pressure).**	
	f.	**Bernoulli's Principle Applied to the Cardiovascular System.**	
	g.	**How Fast Does Your Blood Flow?**	
	h.	**Blood Flow-Laminar and Turbulent .**	
	i.	**Heart Sounds.**	
	j.	**The Physics of Some Cardiovascular Disease.**	
	k.	**Some Other Functions of Blood**	
2.	**Electricity Within the Body**		**5 Hours**
	a.	**The Nervous System and the Neuron.**	
	b.	**Electrical Potentials of Nerves.**	
	c.	**Electrical Signals From Muscles- The Electromyogram**	
	d.	**Electrical Signals From the Heart- The Electrocardiogram**	
	e.	**Electrical Signals From the Brain –The Electroencephalogram**	
	f.	**Electrical Signals From the Eye - The Electroretinogram and the Electrooculogram**	
	g.	**Magnetic Signals From the Heart and Brain- The Magnetocardiogram and the Magnetoencephalogram**	
	h.	**Current Research Involving Electricity in the Body**	
3.	**Cardiovascular Instrumentation**		**2 Hours**
	a.	**Biopotentials of the Heart**	
	b.	**Electrodes**	
	c.	**Amplifiers**	
	d.	**Patient Monitoring**	
	e.	**Defibrillators**	
	f.	**Pacemakers**	
4.	**Physics of the Ear and Hearing**		**4 Hours**
	a.	**The Outer Ear**	
	b.	**The Middle Ear**	
	c.	**The Inner Ear**	
	d.	**Sensitivity of the Ear**	
	e.	**Testing Your Hearing**	
	f.	**Deafness and Hearing Aids**	
5.	**Physics of Eyes and Vision**		**4 Hours**
	a.	**Focusing Elements of the Eye**	
	b.	**Some Other Elements of the Eye**	
	c.	**The retina- The Light Detector of the Eye**	
	d.	**How Sharp Are Your Eyes**	
	e.	**Defective Vision and Its Correction**	
6	**Physics of Diagnostic X-Rays**		**4 Hours**
		Production of X-Ray Beams	
		How X-Rays Are Absorbed	

		Making an X-Ray Image	
		Radiation to Patients From X-Rays	
		Producing Live X-Ray Images – Fluoroscopy	
		X-Ray Slices of the Body	
		Radiographs Taken Without Film	
7.	**Physics of Nuclear Medicine (Radioisotopes in Medicine)**		**3 Hours**
	a.	**Review of Basic Characteristics and Units of Radioactivity**	
	b.	**Sources of Radioactivity for Nuclear Medicine**	
	c.	**Statistical Aspects of Nuclear Medicine**	
	d.	**Basic Instrumentation and Its Clinical Applications**	
	e.	**Nuclear Medicine Imaging Devices**	
	f.	**Physical Principles of Nuclear Medicine Imaging Procedures**	
	g.	**Therapy With Radioactivity**	
	h.	**Radiation Doses in Nuclear Medicine**	
8.	**Physics of Radiation Therapy**		**2 Hours**
	a.	**The Dose Units Used in Radiotherapy- the Rad and the Gray**	
	b.	**Principles of Radiation Therapy**	
	c.	**A Short Course in Radiotherapy Treatment Planning**	
	d.	**Megavoltage Therapy**	
	e.	**Short Distance Radiotherapy or Brach therapy**	
	f.	**Other Radiation Sources**	
	g.	**Closing Thought on Radiotherapy**	
9.	**Radiation Protection in Medicine**		**1 Hours**
	a.	**Biological Effects of Ionizing Radiation**	
	b.	**Radiation Protection Units and Limits**	
	c.	**Radiation Protection Instrumentation**	
	d.	**Radiation Protection in Diagnostic Radiology**	
	e.	**Radiation Protection in Radiation Therapy**	
	f.	**Radiation Protection in Nuclear Medicine**	
	g	**Radiation Accidents**	

Practical (PHYS102)

1	**Visual acuity**
2	**Visual acuity**
3	**Reaction time measurement**
4	**Reaction time measurement**
5	**Flow of blood**
6	**Flow of blood**
7	**Properties of blood (physical)**
8	**Properties of blood (physical)**
9	**Peak expiratory flow rate**
10	**Peak expiratory flow rate**
11	**Audiometer**
12	**Audiometer**
13	**Audiometer**
14	**Tutorials**
15	**Lab review**