

Construct the Curriculum of **Multidisciplinary Course (MDC)**
(based on the following Parameters & Conditions)

Paper: -III

Semester -III

Credit: 3

Paper Name:

Curriculum of Multidisciplinary Course (MDC) - for UG Program

Title of the Course:	MEDICAL PHYSICS
MDC Paper Code:	
Semester = III	
Credit = 3	
Objectives of the Course:	<ul style="list-style-type: none"> i) To provide education for undergraduate students in preparation for careers in Medical Physics. ii) To make the students aware of the applications of Physics in the medical profession iii) To impart knowledge of the normal structure and function of the human body and its major organ systems. iv) To impart basic ideas about X rays and the huge application of X rays in the medical field. v) To impart knowledge on the applications of Medical Physics vi) To impart knowledge about the Medical imaging techniques like MRI, NMR, Ultrasound
Learning Outcomes of the Course	<ul style="list-style-type: none"> (i) Describe the fundamental theories, principles, and concepts that underlie the field of medical physics. ii) Identify and categorize the diverse processes, materials, techniques, practices and terminology relevant to the field of medical physics. iii) Elucidate the biological effects of radiation and its practical applications in both radiation safety and radiation treatment. iv) Students will be able to correlate the adverse effects of radiation on human body and its remedies.

Course Content

Module: -1	<ul style="list-style-type: none"> i) Basic Anatomical Terminology: Standard Anatomical Position, Planes. Familiarity with terms like- Superior, Inferior, Anterior, Posterior, Medial, Lateral, Proximal and Distal. ii) Mechanics of the body: Skeleton, forces and body stability. Muscles and dynamics of body movement. Physics of Locomotors Systems: joints and movements, Stability and Equilibrium iii) Energy household of the body: Energy balance in the body, Energy consumption of the body, Heat losses of the body, Thermal Regulation iv) Pressure system of body: Physics of breathing, Physics of cardiovascular system. v) Acoustics of the body: Nature and characteristics of sound, Production of speech, Physics of the ear, Diagnostics with sound and ultrasound. vi) Optical system of the body: Physics of the eye. vii) Electrical system of the body: Physics of the nervous system, Electrical signals and information transfer.
Module: -2	<ul style="list-style-type: none"> i) X-RAYS: Electromagnetic spectrum, production of x-rays, x-ray spectra, Bremsstrahlung, Characteristic x-ray. Coolidge tube, Rotating anode x-ray tube, quality and intensity of x-ray, X-ray generator circuits, half wave and full wave rectification, filament circuit, kilo voltage circuit, types of X-Ray Generator, high frequency generator, exposure timers and switches. ii) Radiation Physics: Radiation units exposure, absorbed dose, units: rad, gray, relative biological effectiveness, effective dose, inverse square law. Interaction of radiation with matter Compton & photoelectric effect, Rem & Sievert, linear attenuation coefficient. iii) Radiation Detectors: Thimble chamber, condenser chambers, Geiger Muller counter, Scintillation counters and Solid-State detectors, ionization chamber, Dosimeters.
	<ul style="list-style-type: none"> i) Evolution of Medical Imaging, X-ray diagnostics and imaging, ii) Physics of nuclear magnetic resonance (NMR), NMR imaging iii) MRI Radiological imaging, Ultrasound imaging

<p>Module: -3</p>	<p>iv) Physics of Doppler with applications and modes, Vascular Doppler. v) Radiography: Filters, grids, cassette, X-ray film, film processing, fluoroscopy vi) Computed tomography scanner- principle & function, display, generations, mammography. Thyroid uptake system and Gamma camera (Only Principle, function and display). vii) Medical Instrumentation: Basic Ideas of Endoscope and Cautey, Sleep Apnea and Cpap Machines, Ventilator and its modes.</p>
<p>Suggestive Readings:</p>	<p>i) Basic Radiological Physics Dr. K. Thayalan - Jayapee Brothers Medical Publishing Pvt. Ltd. New Delhi (2003) ii) Medical Physics, J.R.Cameron and J.G.Skofronick, Wiley (1978) iii) Christensen's Physics of Diagnostic Radiology: Curry, Dowdey and Murry - Lippincot Williams and Wilkins (1990) iv) Physics of the human body, Irving P. Herman, Springer (2007). v) The essential physics of Medical Imaging: Bushberg, Seibert, Leidholdt and Boone Lippincot Williams and Wilkins, Second Edition (2002) vi) Handbook of Physics in Diagnostic Imaging: R.S. Livingstone: B.I. Publication Pvt Ltd. vii) The Physics of Radiology-HE Johns and Cunningham</p>
<p>Method of Assessment, Measurement, & Evaluation:</p>	
<p>Method of Internship, Apprenticeship, Project, Community Engagement:</p>	