

BS (4 Years) for Affiliated Colleges



Code	Subject Title	Cr. Hrs	Semester
PHY-405	MEDICAL PHYSICS-I (THEORY)	3	VII
Year	Discipline		
4	Physics		

Course Outlines:

Interactions of Ionising Radiation with Matter: Introduction; Beta-rays, range-energy relationship, mechanism of energy loss, ionization and excitation, Bremsstrahlung, Alpha-rays, Range-energy relationship, Energy transfer, Gamma-rays, exponential absorption, interaction mechanisms, Pair production, Compton scattering, photoelectric absorption, photodisintegration, Combined effect, Neutrons, Production classification, interaction, Scattering, Absorption.

Radiotherapy: Introduction, The development of radiotherapy, Radiotherapeutic aims, External beam therapy, Brachytherapy, Unsealed source therapy, Requirements for accuracy and precision, Quality assurance, The role of medical physics.

Medical Imaging: Diagnostic X-rays, Production of X-rays, Absorption of x-ray to other planes, Partial volume effect, Artifacts, Contrast agents in conventional radiography and CT, Diagnostic Ultrasound, Doppler effect, Radionuclide imaging, positron emission tomography (PET), Magnetic resonance imaging (MRI), Contrast agents for MRI.

Books Recommended:

1. *Introduction to Health Physics* by Herman Cember. 3rd Ed. McGraw Hill, New York, 1996.
2. *Thwaites, Radiotherapy Physics* by J.R. Williams, D.I, Oxford University Press, New York, 1993.
3. *Diagnostic Imaging*, by Peter Armstrong and Martin L. 4th Ed., Blackwell Science Ltd. Oxford, 1998.
4. *Radiologic Science of Technologists* by Stewart C. Bushong, 5th Ed. Mosby, 1993.
5. *Fundamentals of Radiation Dosimetry*, by J. R. Greening, 2nd Ed. Adam Hilger Ltd., Bristol 1985.
6. *Radiation Detection and Measurement*, by Knoll G.F., 2nd Ed. Wiley, New York, 1980.
7. *Health Physics* by Dathren, Pergamon.
8. *Physics of Medical Imaging*, by Edwin G.A. Aird, Heinemann, 1988.