B.Sc. - Medical Imaging Technology

Programme Outcomes (POs)

PO1. Develop understanding of human anatomy and physiology as it relates to health and disease

PO2. Demonstrate knowledge of clinical procedures and diagnostic testing in various healthcare settings

PO3. Acquire competency in medical terminology and documentation

PO4. Communicate effectively with patients and healthcare professionals

PO5. Demonstrate understanding of ethical and legal issues related to healthcare delivery

PO6. Familiarize with healthcare management and healthcare delivery systems

PO7. Critically analyze healthcare research and evidence-based practice

PO8. Showcase competency in interprofessional collaboration and teamwork

PO9. Develop lifelong learning and professional development to adapt to changing healthcare environments.

Programme Specific Outcomes (PSOs)

PSO1. Understand the principles and physics of medical imaging technologies such as X-ray, CT, MRI, Ultrasound, and Nuclear Medicine.

PSO2. Operate medical imaging technologies such as X-ray, CT, MRI, Ultrasound.

PSO3. Understand and apply radiation protection techniques to ensure the safety of patients and healthcare professionals during medical imaging procedures.

PSO4. Develop and implement protocols for medical imaging procedures, including patient positioning and use of contrast agents.

PSO5. Demonstrate knowledge of current trends and emerging technologies in the field of medical imaging.

PSO6. Demonstrate professionalism, ethical behaviour, and a commitment to continuing education and professional development in the field of medical imaging technology.

Course Outcomes

2021-2024

Semester	Subject Code	Subject	Course Outcomes
1	21BASMIT103	PHYSICS OF RADIOLOGY, RADIATION PHYSICS AND MEDICAL PHYSICS I	CO1: Analyze physical systems using mathematical tools, including algebra, calculus, and vectors. CO2: Understand the fundamental concepts of mechanics, dynamics, and energy. CO3: Understand the principles of waves, optics, electricity and magnetism CO4: Communicate scientific concepts and results effectively, both orally and in writing. CO5: Develop an appreciation for the beauty and elegance of physics concepts and their role in understanding the natural world.
1	21BASMITD01	RADIOGRAPHIC TECHNIQUES I	CO1: Understand the physical principles underlying X-ray production, including the properties of radiation and the principles of X-ray generation. CO2: Understand the properties of X-ray equipment, including tube construction, collimation, filtration, and beam restriction. CO3: Learn the appropriate selection of technical factors, such as kVp, mA, and exposure time, for different imaging scenarios and patient characteristics. CO4: Study the principles of image formation, including the basic principles and the components equipment of fluoroscopy and mammography CO5: To carry knowledge on imaging processing including AEC and film archiving system.

Semester	Subject Code	Subject	Course Outcomes
1	21BASANA101	ANATOMY I	CO1: Understand the structure and function of the human body, including the organization of the various body systems (e.g., skeletal, muscular, cardiovascular, respiratory, digestive, urinary, and nervous). CO2: Acquire knowledge about the anatomy and physiology of the cell and tissues, including the different types of cells, tissues, and organs and their roles in maintaining homeostasis. CO3: Summarize the structure and function of the skeleton, including the bones, joints, and the musculoskeletal system. CO4: Learn about anatomy and physiology of the muscles, including the different types of muscles, the mechanisms of muscle contraction, and the functional relationships between the muscles and bones.
1	21BASPHY102	PHYSIOLOGY I	CO1: Understand the fundamental principles of cell physiology, including membrane transport, cellular metabolism, and the regulation of cellular activities. CO2: Acquire knowledge about regulation of fluid, electrolyte, and acid-base balance in the body, including the mechanisms of osmoregulation and the role of the kidneys. CO3: Understand physiological mechanisms of cardiovascular function, including the regulation of blood pressure, blood flow, and heart rate. CO4: Understand physiological mechanisms of respiratory function, including the control of breathing, gas exchange, and acid-base balance. CO5: Understand the physiological mechanisms of digestive function, including the regulation of digestive secretions, motility, and nutrient absorption.

Semester	Subject Code	Subject	Course Outcomes
1	21MENVIOVE2	ENVIRONMENTAL STUDIES	CO1 : Demonstrate a basic understanding of the principles of environmental science, including key environmental issues, impact of human activities on the environment and the strategies for promoting sustainability. CO2 : To apply critical thinking and analytical skills to evaluate environmental problems based solutions. CO3 : understand environmental laws and regulations, as well as the legal frameworks for addressing environmental problems CO4 : to assess the role of environmental movements in shaping environmental policy and practice in India, and propose strategies for advancing environmental justice and sustainability in the country CO5: To evaluate and address ethical and logistical challenges associated with conducting fieldwork in environmental studies and propose strategies for improving scientific integrity and social responsibility in environmental research.
1	21ENG1L02	ENGLISH I	CO1: Demonstrate a coherent and systematic knowledge of the field of English literature showing an understanding of current theoretical and literary developments in relation to the specific field of English studies. CO2: Demonstrate a set of basic skills in literary communication and explication of literary practices and process with clarity

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Semester	Subject Code	Subject	Course Outcomes
2	21BASMIT203	PHYSICS OF RADIOLOGY, RADIATION PHYSICS AND MEDICAL PHYSICS – II	CO1: Understand the basic principles of radiation physics, including ionizing radiation, non-ionizing radiation including natural and artificial radiation CO2: Understand the concepts of interaction with matter of x-rays and gamma rays CO3: Apply the concepts of decay, HVL, Law of disintegration of source in radiation physics CO4: Understand the principles of radiation detection, including the use of Geiger-Muller counters and scintillation detectors. CO5: Develop problem-solving skills and the ability to apply physics principles to a real-world situation.
2	21BASMITD02	RADIOGRAPHIC TECHNIQUES - II	CO1: Understand the different types of radiographic equipment, including digital and film-based systems, and their components. CO2: Understand the principles of image formation, including the basic principles and the components of X-ray imaging and CT, MRI, USG, CR, DR and Nuclear medicine imaging CO3: Understand the principles of image processing and how to adjust exposure factors to optimize image quality. CO4: Develop proficiency in the use of radiographic equipment and accessories, including grids, cones, and compensating filters.

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2	**21BASANA201**	**ANATOMY - II**	CO1: Understand of the anatomy and function of the cardiovascular, respiratory, digestive, and urinary systems. CO2: Acquire the knowledge of the anatomy and function of the endocrine and reproductive systems. CO3: Understand of the anatomy and function of the nervous system, including the brain and spinal cord. CO4: Acquire the Knowledge of the anatomy and function of the musculoskeletal system, including the bones, joints, and muscles. CO5: Apply anatomical concepts and principles to the diagnosis and treatment of medical conditions. CO6: Acquire knowledge of the interrelationships between different body systems and how they work together to maintain homeostasis.
2	**21BASPHY202**	**PHYSIOLOGY - II**	CO1: Understand the physiological principles and mechanisms that regulate the functions of the cardiovascular, respiratory, digestive, and urinary systems. CO2: Acquire knowledge of the physiological mechanisms that regulate the endocrine and reproductive systems. CO3: Understand the neural and muscular mechanisms that regulate movement and coordination. CO4: Acquire the knowledge of the physiological processes that regulate body temperature, fluid balance, and electrolyte balance. CO5: Apply physiological concepts and principles to the diagnosis and treatment of medical conditions. CO6: Acquire knowledge of the interrelationships between different body systems and how they work together to maintain homeostasis.

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2	**21ENG2L02**	**ENGLISH – II**	CO1: Display knowledge to cultivate a better understanding of values – both literary values that aid us in literary judgment and also values of life at all stages. CO2: Cultivate ability to look at and evaluate literary texts as a field of study and as part of the wider network of local and global culture.
2	**21BASANA201L**	**PRACTICAL ANATOMY II**	CO1: Understand the basic principles body systems in the field of medical diagnostics. CO2: Gain hands-on experience with various functions used ijn anatomy. CO3: Develop the ability to analyze and interpret clinical findings in order to correlate with theoretical background. CO4: Acquire an understanding of the ethical and legal considerations involved in diagnostics. CO5: Develop skills in the design and implementation of the fundamentals of various body systems involved in clinical aspects.
2	**21BASPHY202L**	**PRACTICAL PHYSIOLOGY II**	CO1: Understand the basic principles and applications of physiological systems in the field of medical diagnostics. CO2: Gain hands-on experience with various instruments used in physiology. CO3: Develop the ability to analyze and interpret physiological data in order to correlate with theoretical background. CO4: Acquire an understanding of the ethical and legal considerations involved in diagnostics. CO5: Develop skills in the design and implementation of the fundamentals of various body systems involved in clinical aspects.

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3	21BASMIT3D03	DIAGNOSTIC IMAGING TECHNIQUES	CO1: Understanding the principles and physics of different imaging techniques. CO2: Knowledge of instrumentation and equipment used in each imaging modality. CO3: Ability to operate and maintain imaging equipment safely and effectively. CO5: Knowledge of the clinical applications of MRI in various medical specialties. CO4: Ability to communicate effectively with doctors, biomedical engineers and other healthcare professionals regarding medical devices and imaging results.
3	21BASMIT3S03	PRINCIPLE OF THERAPEUTIC EMERGENCIES	CO1: Recognize and respond to common medical emergencies that may occur in the radiography department. CO2: Understand the principles of emergency care, including advanced cardiac life support (ACLS), basic life support (BLS), and first aid. CO3: Apply appropriate emergency procedures to stabilize and support patients during medical emergencies. CO4: Use appropriate equipment and medications to manage medical emergencies in the radiography department. CO5: Understand and comply with relevant laws, regulations, and policies related to emergency care and radiation safety.

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3	**21BASBIO301**	**BIOCHEMISTRY I**	CO1: Understand the fundamental principles of biochemistry, including the structure and function of biological macromolecules. CO2: Acquire knowledge of the metabolic pathways involved in the utilization of energy and the production of cellular components. CO3: Understand the regulation of metabolic processes and the mechanisms by which cells respond to changes in their environment. CO4: Acquire Knowledge of the biochemical basis of inherited diseases and disorders. CO5: Analyse and interpret biochemical data, including spectrophotometric and chromatographic techniques. CO6: Knowledge of the principles and techniques of protein purification and characterization.
3	**21BASMIC302**	**MICROBIOLOGY I**	CO1: Understand the diversity of microorganisms and their role in the environment, human health, and industrial processes. CO2: Understand the basic structures and functions of microorganisms, including their cellular and molecular biology. CO3: Apply the methods used for the isolation, cultivation, and identification of microorganisms. CO4: Learn about the interactions between microorganisms and their hosts, including the mechanisms of pathogenesis and the host immune response. CO5: Acquire knowledge about the principles and applications of sterilization, disinfection, and infection control.

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3	21CENG3A02	COMMUNICATIVE ENGLISH	CO 1: To enhance the understanding of LSRW skills and various approaches to language. CO 2: Providing an in-depth academic exposure about various forms of communication to enable students to be better speakers and users' language. CO3: Demonstrate a coherent and systematic knowledge of the field of communication through understanding of current linguistic and literary developments. CO 4: Demonstrate a set of basic skills in literary communication and explication of literary practices and process with clarity CO 5: Write analytically in a variety of formats, including essays, speeches, and reflective writings.
3	21ENTPDG01	ENTREPRENEURSHIP DEVELOPMENT PROGRAM	CO1: Outline the function of the entrepreneur in the successful, commercial application of innovations and recall the different opportunities and successful growth stories. CO2: Learn how to start an enterprise and design business plans that are suitable for funding by considering all dimensions of business. CO3: Prioritize personal attributes that enable best use of entrepreneurial opportunities CO4: Examine Economic conditions with higher level knowledge and understanding of contemporary trends in e-commerce and business finance. CO5: Explore entrepreneurial leadership and management style.
3	21BASBIO301L	PRACTICAL BIOCHEMISTRY	CO1: Develop a comprehensive understanding of the fundamental principles and techniques of biochemistry. CO2: Gain hands-on experience with a variety of biochemical techniques, including protein purification, enzyme kinetics, spectrophotometry, and chromatography. CO3: Understand the structure and function of biological macromolecules, including proteins, nucleic acids, and lipids. CO4: Study the metabolism of carbohydrates, lipids, and amino acids and the regulation of metabolic pathways. CO5: Develop the ability to analyze and interpret biochemical data.

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4	**Clinical Radiography Positioning I**	CO1: Develop an understanding of the different techniques for positioning and immobilizing patients during radiographic exams, including common positions and projections to optimize image quality and minimize radiation dose CO2: Develop proficiency in the use of positioning aids and accessories, such as sandbags, pillows, and straps, to optimize image quality and patient comfort CO3: Develop proficiency in the techniques and procedures for performing common radiographic examinations, such as chest, abdomen, and extremity imaging CO4: Learn how to adjust positioning techniques and parameters to accommodate patients of different ages, sizes, and physical conditions. CO5: Develop skills in radiographic image analysis, including the identification of artefacts, anatomical landmarks, and pathologies
4	**Contrast & Special Procedures -I**	CO1: Understand the principles of contrast radiography and the different types of contrast agents used in medical imaging, including iodinated contrast agents, barium sulfate, and gadolinium-based contrast agents CO2: techniques for administering contrast agents and for monitoring patients during and after contrast radiography. CO3: Develop an understanding of the indications and contraindications for contrast radiography, and the risks and benefits of using contrast agents in different patient populations CO4: Learn the different routes of administration of contrast agents, including oral, rectal, intravenous, intra-arterial, and intra-articular injection. CO5: Develop an understanding of the different types of contrast radiography exams, including gastrointestinal, genitourinary, and vascular imaging.
4	**Nuclear Medicine Imaging Fundamentals**	CO1: Understanding the principles of nuclear medicine imaging and its clinical applications. CO2: Knowledge of the instrumentation and equipment used in nuclear medicine imaging. CO3: Understanding of radiopharmaceuticals and their applications in nuclear medicine imaging. CO4: Understanding of patient preparation and protocols for nuclear medicine imaging examinations. CO5: Knowledge of the nuclear waste management and decontamination protocol.

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4	**Database Management**	CO1: To provide the knowledge of Hospital Management system CO2: To determine the ability to archive data, manage and retrieve the necessary Hospital Management data CO3: To create different visual representation of data CO4: To acquire knowledge of front end and back end of internet CO5: Apply programming fundamentals using programming tools.
4	**Indian Constitution**	CO1: To learn and understand the Indian constitution and follow as a citizen CO2: To remember, understand and apply the Indian constitution and also citizens following the constitution within the framework. CO3: To understand the concept of CM and state governor, PM and president, appointment of supreme court, high court and consumer court judge's CO4: To understand the existing houses and the functioning system of it.