

# M.S. Ramaiah University of Applied Sciences

New BEL Road, MSR Nagar, Bangalore – 560054



**RAMAIAH  
UNIVERSITY**  
OF APPLIED SCIENCES

## PO, PSO, PEO & CO

**Programme: B.Sc. (Hons) in Medical Radiology and Imaging Technology**

**Programme Code: 401**

**Programme Outcome (PO)**

**Programme Specific Outcome (PSO)**

**Program Educational Objectives (PEO)**

**Course Outcomes (CO)**

  
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**Registrar**  
M.S. Ramaiah University of Applied Sciences  
Bangalore - 560 054

# Faculty of Life and Allied Health Sciences (FLAHS)

Programme Name: B.Sc. (Hons) in Medical Radiology and Imaging Technology

## Programme Outcomes (POs)

- PO 1-Clinical care:** Appraise the evidence-based practice in medical imaging and construct an appropriatediagnostic care regime
- PO 2- Communication:** Discuss the findings with the colleagues and radiologists to plan the procedure and imagesto be acquired
- PO 3- Membership of a multidisciplinary health team:** Discuss and communicate with and summarize relevant information to, other stakeholders including members of the healthcare team
- PO 4- Ethics and accountability at all levels:** Describe and apply the basic concepts of clinical ethics to actual casesand situations
- PO 5- Commitment to professional excellence:** Demonstrate respect for each patient's rights of autonomy,privacy, and confidentiality
- PO 6- Leadership and mentorship:** Develop leadership in quality improvement and diagnostic service delivery toenhance the well-being of the society and enrich healthcare experience
- PO 7- Social accountability and responsibility:** Assess the appropriate technical factors for exposure related to the positioning and modality as per the requirement
- PO 8- Lifelong learning:** Evaluate the need and prioritize lifelong learning as an important outcome across theprofessional career

## Programme Specific Outcomes (POs)

At the end of the BSc (Hons) medical radiology and imaging Technology Programme the graduate will be able to:

- PSO-1.** Apply the knowledge in instrumentation and patient care to develop innovative and safe solutions to challenges in medical radiology and imaging
- PSO-2.** Adapt to technological advancement in imaging and diagnostics by upgrading to the latest design processes in medical radiology and imaging
- PSO-3.** Demonstrate the leadership qualities and strive for the betterment of the organization, environment, and society
- PSO-4.** Demonstrate an understanding of the importance of life-long learning through professional development, practical training, and specialized certifications

  
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## Programme Education Objectives

- PEO 1- Graduates will develop profound knowledge to pursue successful industrial, academic, and research careers in specialized fields of radiological and imaging technology
- PEO 2- Graduates will be engaged in ongoing learning and professional development through self-study, and continuing education in medical imaging and also in other allied fields.
- PEO 3- Graduates will apply their technical skills, exhibiting critical thinking and problem-solving skills in professional clinical imaging practices or tackle social and technical challenges.
- PEO 4- Graduates will adopt the ethical attitude and exhibit effective skills in communication, management, teamwork, and leadership qualities.

## Course Outcomes (COs)

Course Title & Code: General Anatomy (19AHG101A)

Upon completion of this course students will be able to:

- CO-1. Describe the structure and functional organization of a basic human cell and the normal anatomical positions and planes of the body
- CO-2. Explain the structure and functions of basic tissues
- CO-3. Explain the components of the organ systems and its basic functions
- CO-4. Identify the parts of a compound microscope and differentiate microscopy of basic tissues
- CO-5. Demonstrate the parts and position of bones in the human body and early development of fetus
- CO-6. Demonstrate the surface anatomy of structures and interpret data obtained from various imaging techniques.

## Course Outcomes (COs)

Course Title & Code: General Physiology (19AHG102A)

Upon completion of this course students will be able to:

- CO-1. Describe the functions of the organ systems in the body
- CO-2. Explain the mechanisms for the execution of these functions for homeostasis through the secretions of chemical and humoral factors
- CO-3. Explain the regulatory mechanisms in the control of blood pressure, urine formation maintenance of extracellular and intracellular volume
- CO-4. Perform to assess the normal values and parameters of the bodily function indicators such as blood indices, blood gases



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## Course Outcomes (COs)

Course Title & Code: Health Care Delivery Systems of India (19AHG103A)

Upon completion of this course students will be able to:

- CO-1. Describe the Health Care delivery system in India at primary, secondary and tertiary level and identify their role in the health care team
- CO-2. Explain the AYUSH system of medicine
- CO-3. Explain the National Health programmes in terms of operation, achievements and constraints
- CO-4. Explain the importance of Demography and Vital statistics in planning health policy
- CO-5. Discuss role of epidemiology and epidemiological methods in health

## Course Outcomes (COs)

Course Title & Code: General Microbiology (19AHG107A)

After undergoing this course students will be able to:

- CO-1. Describe the morphology, physiology and characteristics of microorganisms
- CO-2. Describe the principles and practice of sterilization and disinfection
- CO-3. Discuss immunology, and immunity
- CO-4. Demonstrate sterilization procedures and use of sterilization equipment
- CO-5. Demonstrate Collection and transport of specimens to the laboratory

## Course Outcomes (COs)

Course Title & Code: Applied Physics (19AHG116A)

After undergoing this course students will be able to:

- CO-1. Explain the basic concepts in sound, electricity and magnetism, laser physics and electromagnetic radiation
- CO-2. Describe concepts in optical fibres
- CO-3. Describe basic properties of fluids
- CO-4. Conduct experiments as per the standard procedures and tabulate the measured values
- CO-5. Calculate the required parameters and plot the results
- CO-6. Interpret, compare with standard results and draw conclusions

## Course Outcomes (COs)

Course Title & Code: Basic Electrical & Electronics (19AHG108A)

After undergoing this course students will be able to:

- CO-1. State various laws of electric and magnetic circuits and explain their significance in biomedical instrumentation
- CO-2. Explain DC machines, transformers and their applications

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- CO-3. Solve simple numerical problems on electric circuits and magnetic circuits,
- CO-4. Explain working principles of PN junction diode, Zener diode, transistors and amplifier configurations
- CO-5. demonstrate electrical and electronic circuits for hardware modules using standard EDA tool

### Course Outcomes (COs)

**Course Title & Code: General Biochemistry (19AHG111A)**

**Upon completion of this course students will be able to:**

- CO-1. Describe the various laboratory apparatus used, the steps in specimen collection and safety measurements to be taken in biochemistry laboratory
- CO-2. Explain different models of atomic structure, acids, bases, buffers and disturbances in acid base balance
- CO-3. Explain quality control, precision, specificity, sensitivity when conducting special investigations
- CO-4. Demonstrate qualitative and quantitative estimations of various analyses (urine, blood)
- CO-5. Interpret the various biochemical parameters in health and disease

### Course Outcomes (COs)

**Course Title & Code: General Pharmacology (19AHG112A)**

**Upon completion of this course students will be able to:**

- CO-1. Describe pharmacokinetic principles in relation to drug administration
- CO-2. Explain the concept of pharmacodynamics in relation to drug utilization in therapeutics
- CO-3. Explain the concept of chemotherapy in relation to infectious diseases
- CO-4. Explain the importance of adverse effects in therapeutics of various drug usage
- CO-5. Identify drugs dosage forms and posology in management of diseases and calculate doses in various age groups
- CO-5. Interpret the importance of drug combinations with reference to therapeutic index and drug utilization

### Course Outcomes (COs)

**Course Title & Code: Concepts of Infection Prevention (19AHG XXX)**

**After undergoing this course students will be able to:**

- CO-1. Explain the steps involved in infection prevention and control
- CO-2. Understand the working and application of CSSD
- CO-3. Explain the importance of antibiotic resistance in the patient care and ways to prevent it.
- CO-4. Apply the concepts of biomedical waste management to ensure clean and hazard free hospital environment

  
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## Course Outcomes (COs)

Course Title & Code: General Pathology (19AHG114A)

Upon completion of this course students will be able to:

- CO-1. Describe basic facts and concepts of pathology
- CO-2. Explain fundamental aspects of hematology and blood banking
- CO-3. Explain the various clinical pathology tests
- CO-4. Perform laboratory tests related to hematology and clinical pathology
- CO-5. Interpret the results of laboratory tests
- CO-6. Apply concepts of general pathology to understand pathological basis of disease

## Course Outcomes (COs)

Course Title & Code: Basic Radiological Physics (22MRTXXX)

After undergoing this course students will be able to:

- CO-1. Comprehend the fundamental physics of diagnostic radiology
- CO-2. Understand the basic functioning of all x-ray equipment and follow radiation safety guidelines.
- CO-3. Explain the detection and measurement of radiation
- CO-4. Explain the various radiographic methods and keep up to date on technological advancements in the diagnostic field

## Course Outcomes (COs)

Course Title & Code: Basic Radiological Equipment (22MRTXXX)

After undergoing this course students will be able to:

- CO-1. Understand the basic working principle and equipment of the various modalities
- CO-2. Explain the safe handling of the equipment
- CO-3. Explain the applications of various equipment's in diagnostic radiology
- CO-4. practical learning and training in operating the equipment and stay abreast of the latest technology advancements

## Course Outcomes (COs)

Course Title & Code: Entrepreneurship Development (22MCM201A)

After the successful completion of this course, the student will be able to:

- CO-1. Discuss the concepts and process of entrepreneurship
- CO-2. Construct and apply the idea generation techniques
- CO-3. Examine the opportunities for launching of new venture and various entry strategies
- CO-4. Acquire the skills for creation and management of entrepreneurial venture
- CO-5. Present a viable business plan, for business success

  
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## Course Outcomes (COs)

Course Title & Code: Directed Clinical Education - I (22MRTXXX)

After undergoing this course students will be able to:

- CO-1. Intended Learning Outcome
- CO-2. Assist in setting up conventional and modern radiologic equipment for indicative radiographs
- CO-3. Assist in developing good quality X-ray films in the dark room
- CO-4. Assist senior technician in general care and performing functional tests of the equipment

## Course Outcomes (COs)

Course Title & Code: Radiographic positioning (22MRTXXX)

After undergoing this course students will be able to:

- CO-1. Explain the proper positioning techniques
- CO-2. Learn how to independently confirm and check the image quality and post- processing techniques.
- CO-3. Understand and follow the norms of radiation safety
- CO-4. Handle complex cases by using critical thinking and reasoning.

## Course Outcomes (COs)

Course Title & Code: Radiographic contrast procedures (2MRTXXX)

After undergoing this course students will be able to:

- CO-1. Understand the pharmacology of the contrast media and its administration for various procedures
- CO-2. Gain knowledge regarding patient preparation, procedure, and post-procedure care for all radiological contrast procedures.
- CO-3. Explain and handle complex cases using modified techniques and positioning while adhering to radiation safety regulations.
- CO-4. Handle the practical issues that arise when using contrast agents and the ways to resolve them.

## Course Outcomes (COs)

Course Title & Code: Radiographic Image processing techniques (22MRTXXX)

After undergoing this course students will be able to:

- CO-1. Get oriented to the work flow in the image processing rooms and equipment working principle
- CO-2. Explain the factors influencing image quality and ways to improve it using technical processing factors.
- CO-3. Receive hands-on training in the safe handling of processing equipment, as well as its care and importance.

  
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- CO-4. Stay abreast of the latest and emerging technologies in the field of diagnostic imaging post-processing software.

### Course Outcomes (COs)

Course Title & Code: Directed Clinical Education - II (22MRTXXX)

After undergoing this course students will be able to:

- CO-1. Assist in Developing of radiographic films.
- CO-2. Have basic knowledge and understanding of the principles of ultrasound, Doppler and MRI scanners.
- CO-3. Assist in preparing and managing patients for radiological and imaging procedures
- CO-4. Have basic understanding of Macro radiography, mammography, mobile radiography, stereography, tomography and forensic radiography.

### Course Outcomes (COs)

Course Title & Code: Basic to advanced Computed Tomography (22MRTXXX)

After undergoing this course students will be able to:

- CO-1. comprehend the CT working principles, instrumentation and physics
- CO-2. Familiarized with cross-sectional grey scale anatomy and radiation safety
- CO-3. Safe handling the equipment by receiving hands-on training and staying up to date on the latest technological advancements in the field
- CO-4. Evaluate image quality, carry out the necessary post-processing, annotations, image archiving, and documentation

### Course Outcomes (COs)

Course Title & Code: Basic to advanced Ultrasound (22MRTXXX)

After undergoing this course students will be able to:

- CO-1. comprehend the Ultrasound working principles, instrumentation and physics
- CO-2. Familiarized with cross-sectional grey scale anatomy in ultrasound
- CO-3. Safe handling the equipment by receiving hands-on training and staying up to date on the latest technological advancements in the field
- CO-4. Evaluate image quality, carry out the necessary post-processing, annotations, image archiving, and documentation

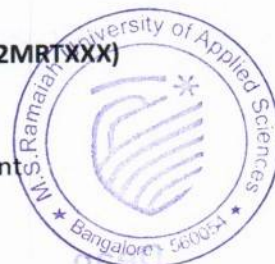
### Course Outcomes (COs)

Course Title & Code: Quality assurance and Regulatory requirements in radiology (22MRTXXX)

After undergoing this course students will be able to:

- CO-1. Understand the importance of quality assurance tests in the departments

  
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- CO-2. To get oriented to quality assurance program at different levels
- CO-3. Explain the biological effects of radiation, along with ways to keep within safe exposure limits.
- CO-4. Explain the requirements and guidelines for diagnostic radiology regulatory bodies at the national and international levels.

## Course Outcomes (COs)

**Course Title & Code: Project Management (22MCM202A)**

**Upon completion of this course students will be able to:**

- CO-1. Explain the characteristics of projects, Operations and principles of Project Management
- CO-2. Discuss the Project Management Competency Elements as per PMA's Individual Competence Baseline Ver 4.0
- CO-3. Discuss the tools for Project Execution, Monitoring and control
- CO-4. Apply the tools for project planning and Create a Project Management Plan covering Project Charter, Work Breakdown Structure, Project Organisation, Time Management Plan and Risk Management Plan

## Course Outcomes (COs)

**Course Title & Code: Directed Clinical Education - III (22MRTXX)**

**After undergoing this course students will be able to:**

- CO-1. Assist in Newer imaging techniques such as angiography and venography.
- CO-2. Check, identify and prepare the radiological equipment needed for the procedures
- CO-3. Assist in preparing and managing patients for radiological and imaging procedures
- CO-4. Will have basic knowledge in hospital procedures, patient care, record keeping, drug management and principles of asepsis.
- CO-5. Ensure that radiation safety procedures are adhered and followed
- CO-6. Conduct routine quality checks on a day to day and weekly basis.

## Course Outcomes (COs)

**Course Title & Code: Basic to advanced Magnetic Resonance Imaging (22MRTXX)**

**After undergoing this course students will be able to:**

- CO-1. comprehend the MRI working principles, instrumentation and physics
- CO-2. Familiarized with cross-sectional grey scale anatomy in MRI
- CO-3. Safe handling the equipment by receiving hands-on training and staying up to date on the latest technological advancements in the field and MR Safety
- CO-4. Evaluate image quality, carry out the necessary post-processing, annotations, image archiving, and documentation

  
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## Course Outcomes (COs)

Course Title & Code: Basic concepts of Interventional radiology and Nuclear medicine (22MRTXXX)

After undergoing this course students will be able to:

- CO-1. Understand the basics of nuclear medicine and interventional radiology equipment.
- CO-2. Explain radiation safety and radioisotope handling in the department.
- CO-3. Hands-on training in the department ensures safe equipment handling.
- CO-4. Evaluate image quality, carry out the necessary post-processing, annotations, image archiving, and documentation

## Course Outcomes (COs)

Course Title & Code: Directed Clinical Education – IV (22MRTXXX)

After undergoing this course students will be able to:

- CO-1. Assist in radio diagnostic procedures
- CO-2. Check the radiological equipment under supervision
- CO-3. Assist in preparing and managing patients for radiological and imaging procedures
- CO-4. Evaluate quality of images for diagnosis
- CO-5. Ensure that radiation safety procedures are adhered and followed
- CO-6. Conduct routine quality checks on a day to day and weekly basis under supervision

## Course Outcomes (COs)

Course Title & Code: Research Project (19MRT401A)

Upon completion of this course students will be able to:

- CO-1. Refine the problem in Allied Health Science
- CO-2. Identify appropriate methodology to solve the problem
- CO-3. Propose solutions to the problem identified
- CO-4. Prepare a project report as per the specified guidelines
- CO-5. Presentation of the research finding in an appropriate forum

## Course Outcomes (COs)

Course Title & Code: Internship (19MRT402A)

Upon completion of this course students will be able to:

- CO-1. Demonstrate ability to perform routine radiographic views with while observing adequate patient and personnel radiation safety
- CO-2. Assist in special radiographic procedures with respect to Urological, Gastro Intestinal and Gynecological studies.
- CO-3. To understand the various aspects of image distribution over a local and wide area network
- CO-4. To observe routine Ultrasound and Doppler scans and to be able assist in special procedures

  
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and intervention as part of the therapeutic team.

**CO-5.** For female interns to demonstrate ability to perform routine mammographic procedures

**CO-6.** Demonstrate ability to perform routine CT and MRI scans with while observing adequate patient and personnel safety

### **Course Outcomes (COs)**

**Course Title & Code: Research Project (19MRT401A)**

**Upon completion of this course students will be able to:**

- CO-1.** Refine the problem in Allied Health Science
- CO-2.** Identify appropriate methodology to solve the problem
- CO-3.** Propose solutions to the problem identified
- CO-4.** Prepare a project report as per the specified guidelines
- CO-5.** Presentation of the research finding in an appropriate forum

### **Course Outcomes (COs)**

**Course Title & Code: Internship (19MRT402A)**

**Upon completion of this course students will be able to:**

- CO-1.** Demonstrate ability to perform routine radiographic views with while observing adequate patient and personnel radiation safety
- CO-2.** Assist in special radiographic procedures with respect to Urological, Gastro Intestinal and Gynecological studies.
- CO-3.** To understand the various aspects of image distribution over a local and wide area network
- CO-4.** To observe routine Ultrasound and Doppler scans and to be able assist in special procedures and intervention as part of the therapeutic team.
- CO-5.** For female interns to demonstrate ability to perform routine mammographic procedures
- CO-6.** Demonstrate ability to perform routine CT and MRI scans with while observing adequate patient and personnel safety

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