Syllabus

For

Bachelor of Science

In

Radiology and Imaging Technology

(B.Sc.- Radiology and Imaging Technology)

Academic Programme

Duration: 3 years
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About the course:

Bachelor of Science in Radiology and Imaging Technology is a three year graduate programme. Medical Radiography and Imaging is the health profession concerned with the direct administration of radiation, primarily x-rays, in disease diagnosis and injury assessment. Medical imaging studies have been a cornerstone in medical diagnosis for decades; however, technological advances and the addition of new imaging modalities now place medical imaging among the most dynamic, expanding and high demand fields in clinical medicine.

Medical Imaging clinical practice includes: general radiography such as orthopedics, pediatrics and mammography, vascular imaging, cardiac catheterization studies, computerized tomography, and magnetic resonance imaging. Medical imaging professionals are employed in medical centers, community and private hospitals, clinics, and physicians' offices.

Mission:

The Program prepares students to practice competently and effectively as medical imaging professionals in diverse healthcare environments. The academic and clinical foundation in the curriculum develops graduates with professional flexibility and adaptability to assume prominent roles and responsibilities after graduation in both career and scholarly pursuits.

As a student enrolled in this Program you will:

- Receive comprehensive advising and mentoring from seasoned allied health faculty
- Have a premium academic schedule that assures seating in required courses
- Participate in discussion groups on topics such as interviewing and applying to clinical sites
- Be coached for successful transition from the university environment to the clinical environment
- Apply for a number of scholarships that are exclusive to health care students
- Join the Medical Imaging Sciences Club and benefit from activities that will help you gain a better understanding of your major and your chosen profession
- Learn from and build friendships with other health care students including those in other majors

Additionally, the program provides graduates with knowledge and skills to advance in the science and practice of medical imaging. It also provides a foundation for graduate education in masters and doctoral programs.
Course Suitability:

Candidate should have patience, a calm nature, an objective approach towards the patients and an understanding of people of all ages. They have the nature of enhancing the confidence in patients, tolerance, a strong willpower, strength of mind and purpose. Candidates must possess a strong scientific and technical bent of mind, the ability to learn new skills and adapt to the changes and a spirit for teamwork, along with self-confidence. They should have good interpersonal skills so as to communicate with other members of the team and to provide support for patients who may be frightened or uncertain about what is going to happen.

Student Population Served:

Bachelor of Science in Medical Radiography and Imaging Technology graduate will:

Acquire an outstanding level of instruction in the areas of liberal arts education, didactic professional course work, and clinical education that will have encompassed the cognitive (problem solving and critical thinking) psychomotor and affective domains.

Be educated to meet the demands of an advanced level medical imaging professional including excellent clinical patient care skills in both an oral and written communication format.

Demonstrate mastery of instruction content to successfully pass the specific advanced medical imaging certification examination.

Function as a multi-skilled, bachelor degree prepared competent imaging professional who will provide compassionate and highly efficient patient care services.

Student Learning Outcomes:

The fulfillment of our mission and goals through an integrated curriculum insures students attain the following learning outcomes:

1. Obtain a level of clinical competence appropriate for an entry-level medical imaging professional
2. Possess critical thinking skills to adapt to changing clinical environments and patient needs
3. Exhibit professionalism through consistent ethical behavior and
4. Demonstrate communication skills for effective communication with patients, families, and other healthcare providers.

Students progress through the curriculum and meet course learning objectives that culminate in the accomplishment of the above learning outcomes.
Career Options:

Ample opportunities as a radiologist in diagnostic imaging centres, super specialty hospitals, government and private hospitals. Self employment opportunities as well as option to pursue further studies are also available to radiologist. Graduates have the options of pursuing a career in various specializations of Radiography such as in Bone Densitometry, Basic X-Ray, Computed Tomography, Mammography, MRI, Fluoroscopy, Angiography, Interventional Radiology, Cardiovascular Interventional Radiology, etc.

Some job types are:

Diagnostic Radiographer
Radiation Therapy Educator
Radiation Protection Specialist
Radiation Therapy Team Supervisor
Radiation Therapy Technologist
Radiation Therapy Treatment Researcher
Therapy Radiographer
X-Ray Technician

Medical Devices used:
CT-SCAN MACHINE

100MA X-RAY MACHINE COMBINED WITH SINGLE POSITION TABLE
ADMISSION AND ENROLMENT OF STUDENTS

- Admission shall be done on the basis of merit, providing for reservations in accordance with the Act.

- The merit shall be determined by the marks obtained by the candidates in qualifying examination.

ELIGIBILITY CRITERIA FOR ADMISSION

- Entry to First Year - 12th pass in biology;

- The FN/PIO/CIWGC students shall meet the eligibility conditions outlined above.

- The qualifying examination passed by FN/PIO/CIWGC students should be considered equivalent to eligibility examination by the Association of Indian Universities/Academic Council.
• The candidates should also satisfy other conditions as prescribed by the AICTE/UGC from time to time, and physical fitness as may be prescribed by the Academic Council of the University.

**NOTE:** The candidates appearing in the qualifying examination are also eligible to apply, subject to the condition that they must fulfill the eligibility criteria as given above at the time of registration in the programme.

**MEDIUM OF INSTRUCTION AND EXAMINATIONS**

The medium of instructions and examination shall be English in all the programmes, except in language courses where it is necessary to use the corresponding mediums.

**UNIVERSITY FEE**

Every student has to deposit his total Fee, other charges and dues, if any, in the beginning of the semester at the time of Registration, failing which he will not be permitted for registration in the programme.

**FELLOWSHIPS, SCHOLARSHIPS, STIPENDS, MEDALS AND PRIZES**

Fellowships, Scholarships, Stipends, Medals and Prizes may be instituted by the University and awarded as per rules.

**REGISTRATION**

• Every Student will register every semester for courses that he wishes to pursue in that semester.

• A non-registered student will not be allowed to attend classes and take examination even if he has paid the fees.

• The late registration of a freshman who is admitted after the start of the semester may be done at the time of admission by the authorized official.
Adding and Dropping of Courses

- A student may be permitted to add or drop course(s) within two weeks of the beginning of the semester.

- In case a student has been allowed to change the course or programme during the current semester by the University, the classes attended in the previous course may also be considered in calculation of attendance to determine the eligibility for appearing in ESE.

MID – TERM MIGRATION OF STUDENTS

- Inter-university migration shall not be allowed in normal circumstances.

- Under exceptional circumstances, mid-term transfer of a student from any other University to IEC University may be permitted on a case to case basis. In all such cases, the approval on the transfer of relevant credits the student has already earned in that University may be granted by the Academic Council.

TRANSFER OF PROGRAMME

A student once admitted and registered in a programme will not be allowed to change the programme under any circumstances.

ACADEMIC SYSTEM

- The University will follow semester system in all of its PG/ Integrated programmes.

  Summer Semester

  - The Vice Chancellor may decide to hold a Summer semester on the recommendation of the Academic Advisory Committee.

  - Summer semester is a special privilege to be offered at the discretion of the University, and the University will not be under any obligation to offer Summer semester every year.

  - Summer semester, if offered, may be allowed only for students who are not on disciplinary probation.

  - A list of courses to be offered in the Summer semester is brought out during the even semester before the ESE. Only a few selected courses as decided by the University may be offered during the Summer semester.
• A course may be offered in the Summer semester if there are a minimum of ten students registering for it.

• Unless prescribed otherwise in the Regulations of any specific programme, the Summer semester is a fast-paced semester where all the rules for the normal semester shall apply but the registration shall be limited to three courses having total credits not exceeding 12.

• The Summer semester may be of about seven to eight weeks duration and each course may run on about two times the normal load, thus imparting equivalent to about 16 weeks of teaching, but at an accelerated pace.

• Whenever possible, the deficient students may be allowed to register for backlog courses and/or marginal courses (in which they have obtained D grade) in the Summer semesters on payment of necessary fees per course.

• A student can normally register only for backlog or marginal courses for the Summer semester.

• In view of the short duration of the Summer semester, late registration and adding and dropping of courses are not permitted beyond three days of the start of classes.

   **Academic Counselor**

• Upon joining the University, each student will be assigned an Academic Counselor.

• The Academic Counselor will discuss with the student his academic performance in previous semester(s) and suggest the number and nature of courses the student should register during the ensuing semester, within the framework of that Programme curriculum.

• The Academic Counselor may advice students having many backlog courses to register for lesser number of credits (subject to the minimum credits specifications) and prepare a revised plan of study for the student with a slower pace.

   **Curriculum**

• Each Programme contains a prescribed course structure which is generally called Curriculum.
• Curriculum of a Programme contains courses grouped under various heads, viz. Open Core (OC), Open Elective (OE), and Programme Core (PC), Programme Elective (PE).

• These courses will be offered to a student in a pre-determined manner in each semester.

• Students are expected to take courses offered in each semester and clear them subject to various conditions as prescribed in this regulation.

**Syllabus**

- A course syllabus is a document that explains what a student is going to study in that course.
- Each course will have a course code, course title, Lecture- Tutorial- Practical- Credit (LTPC) distribution indicating the weightage of the course, version of syllabus revision, course pre-requisites/ anti-requisites/ co-requisites (if any), course objectives, expected outcome, short and detailed description of the topics, suggested text and reference books, the mode of evaluation adopted, the effective date of application of the revised version of the syllabus.

**Course Plan**

- A course plan consists of a list of lectures/ experiments carried out in each instructional class/ lab by the course teacher during the semester as per the LTPC of the course, with details like mode of delivery, reference material used, etc.
- One hour of lecture/ tutorial classes or two hours of laboratory work/ seminar/ practical/ group discussion per week constitutes ONE credit for the course. Separate course plans need to be prepared for the theory and laboratory portions of any course, if the course has an embedded lab component.

**Example:**

An LTPC of 2-1-2-4 means 2 hour of class room lecture; one hour of tutorial and one hour of laboratory, all delivered within a calendar week. This course will have 4 credits.
Course Flowchart

- A flowchart describes how various courses under OC, OE, PC and PE are connected through prerequisites.
- Standard pictorial representation are adopted to indicate various types of courses.
- They may be grouped to indicate the proposed semester of offering.
- Necessary pre-, anti- and co- requisite requirements may also be included in the flow chart.

Structure of the Programmes

The details of OC, OE, PC and PE courses and credit requirements of various Programmes to become eligible for the completion and award of Degree is called Programme Structure.

Minimum Credit Requirement

- The minimum credit requirement for the completion of the Programme and award of UG degree shall be as given below.
- Further, the student must meet the course and credit distribution also as specified under the Programme.
- Due to various features of FCBS, it is possible for a student to reach the minimum credit requirements without completing the courses under OC/PC or without meeting the credit requirements under OE/PE.
- Under such circumstances, though the student has met the minimum credit requirements, it is mandatory for the student to complete all courses under OC, PC, OE and PE to become eligible for the Degree.

Minimum Credit Requirement = 135 Credits

Credit Distribution

In programme, the course credits will be distributed among various fields of study such as; Engineering, Science, Humanities, Management, Arts, History, Languages, Law, Commerce, Finance, Accounting etc. as per requirement of the Programme.
Course Distribution

The curriculum of each Programme contains courses that are grouped into Open Core (OC), Open Elective (OE), Programme Core (PC) and Programme Elective (PE).

Open Core (OC)

- Courses listed under Open Core are basic in nature and are expected to enhance student’s knowledge in various disciplines apart his own discipline.
- OC courses may be listed by a specific course code and course title.
- In few programmes, a minimum credit requirement may be fixed to be met by taking one or more courses offered in a group under OC.
- Student Project, Industrial training etc. are part of OC requirements.
- A Foreign language course may be in OC category for some programme.
- This can be met by taking any course offered from a basket of foreign language courses, like French, German, Chinese, Japanese, Spanish, etc. listed under OC.

Programme Core (PC)

- Courses listed under Programme Core of a curriculum are mandatory to the specific Programme.
- Students have to complete all the courses listed under PC to become eligible for the degree.
- No substitution of a PC course is permitted.

Open Elective (OE)

- A course, declared as Open Elective for one Programme, can be taken by a student of any other Programme also.
- This gives an opportunity for students to satisfy their aspirations in other disciplines also.
• However, the number of Open Elective courses for any programme may be fixed. Some courses under OE for a given Programme may be PC or PE courses for other Programmes.

• Since OE courses offered by a particular Programme are expected to be taken by other discipline students, they may not have a prerequisite other than that appear under OC.

• A student who is not willing to take any OE course shall be permitted to take PE course instead.

  **Programme Elective (PE)**

• By taking Programme Elective courses, students get an opportunity to study advanced or applied or specialized courses.

• These courses will generally provide an in-depth knowledge of a specific sub-field, the student has taken as his major specialization.

• PE courses need not be restricted to the major specialization of the student.

• To provide an opportunity to students to take interdisciplinary courses, such identified courses will also be listed under PE courses.

  **Industrial / Practical Training**

• Wherever required in the programme, all students of that programmes should undergo industrial/ practical training in a reputed industry in, anytime after one year of study. This is listed under Open Core course category. This training can be availed in a single stretch or in two stretches.

• Students who have successfully completed their training are required to register for industrial/ practical training in the following semester for award of grades.

  **Project/ Thesis/ Dissertation:**

• Wherever required in the PG/ Integrated programme, all students of that programmes should successfully complete Project/ Thesis/ Dissertation work.

• A student has to select a thesis supervisor at the beginning of the last year of the programme, if not done earlier.

• A student shall not normally have more than two supervisors at any given time.

• Thesis supervisor(s) of a student will normally be appointed from amongst the faculty members of the University using modalities decided by the departments.
• A student can have a co-supervisor from outside the University on the recommendation of the Supervisor and with approval of the Director of the Institute.

• In case there has been a change/addition in the supervisor(s), the thesis will not be submitted earlier than three months from the date of such change.

• Normally, a faculty member shall not supervise more than five individual PG candidates. However the department may evolve a transparent policy for the distribution of PG students amongst the faculty members in the department.

• In case a faculty member is suspended / debarred for indulging in lowering the prestige of the University in any manner, he shall cease to be a thesis supervisor.

• If a supervisor resigns/ expires/ leaves the University, alternative/ caretaker supervisor be appointed by the Departmental Postgraduate Committee (DPGC.)

• Submitting a thesis that was bought (purchased)/ borrowed/ thesis submitted in another University/ Institution shall be considered as examination malpractice and will be awarded an ‘F’ grade.

• Students have the responsibility to decide on the specific thesis area and title, and carry out substantial portion of the literature survey at the beginning of their final year.

• Various time limits specified for monitoring and evaluation of performance of the student, to be announced by the University in each semester, should be strictly followed.

**Minimum/ Maximum Credit Limits for Course Registration**

• The Average Academic Load in a regular semester will be of 23 credits.

• However, a fast pace student can register for a maximum of 28 credits.

• Similarly a slow pace student can register for a minimum of 16 credits in a regular semester (other than during summer semester).

• Under no circumstances, a student will be permitted to cross these limits.

• A student carrying out the last registration of his Programme will be permitted to register less than 16 credits if the minimum credit requirements for the completion of Programme so require.

• The average number of credits a student can register during a Summer semester shall be between 6 and 8, or 2 courses.
• However, in special cases, the student may be permitted to register a maximum of 12 credits during a Summer semester.
• There is no minimum number of credits fixed for course registration during Summer semester.

**Course Prerequisites / Anti-requisites/ C-requisites**
• Some courses may have specific prerequisites to be met before a student can register for the course in the current semester.
• Students who had received an ‘F’ grade in a prerequisite course are also permitted to register the next level course by assuming that they had attained the required ‘exposure’ by attending that course.
• This stand is adopted so that the student can make further progress towards earning credits and his progress need not be pulled down by backlog courses. Thus, concurrent registration of a prerequisite and next level course becomes a possibility.
• Similarly, a course may have an anti-requisite and/ or co-requisite.
• When two courses having almost similar/ same course contents and considered as equivalent are made available to a student to choose within a group, and to prevent students crediting both the courses, the anti-requisite option can be used.
• Similarly, an independent laboratory course can be coupled with a theory alone course through a co-requisite thereby forcing a student to register both the courses together.

**Course Equivalence**
• FCBS permits a student to register a course again to clear the backlog.
• When the student registers a course next time, there could be some modifications carried out in the syllabus of course(s).
• If the changes effected are marginal, both the syllabi are considered to be equivalent and the student has to undertake the new syllabi currently offered.
• No separate classes with the old syllabi will be conducted for the student to clear the backlog.
• However, any changes in curriculum will be applicable to the students admitted later and the earlier batches continue to follow the curriculum existed at the time of their joining the Programme only.
• After careful study of syllabi, the University may identify new courses considered equivalent to the courses that were dropped from the curriculum for various reasons.
• Course equivalence is applicable to all curricula, present and past.
• However, the number of credits to be earned cannot be altered.

Audit Course
• A student willing to get an exposure of a specific course, not listed in his Programme curriculum, may be permitted to register that course as an Audit course only if his CGPA is equal to or more than 8.0 at the time of Registration.
• A student can register for a maximum of two audit courses only during his entire programme.
• The student should maintain the minimum attendance conditions specified in Audit course as well.
• He will be awarded satisfactory ‘S’ grade or unsatisfactory ‘X’ grade based on his performance in the course.

PG Teaching Experience
To provide an opportunity to Final year students having current CGPA 8.50 or more, value-addition schemes are available in the University.
• Such students may be awarded tutoring assignments in the lower year courses.
• Such contributions will be duly recognized by providing financial support and making a mention in the Grade sheets.

Vice Chancellor’s List
• Students who maintain a CGPA of 9.50 and above, starting from the beginning of 3rd semester results and subsequently, having no ‘F’ grade to their credit, having never debarred for lack of attendance in any ESE or indiscipline, will be placed on Vice Chancellor’s List for their meritorious performance.
• Their name will be removed from the Vice Chancellor’s List if their CGPA falls below 9.50 or they receive an ‘F’ grade or are debarred due to lack of attendance in any ESE or an act of indiscipline subsequently.
• Such students will be accorded benefits/ recognition as per rules.
Conversion Factor for Converting CGPA into Marks Equivalent

If a conversion to marks is required, the following formula may be used to calculate the same:

The Equivalent Percentage of Marks = CGPA* 9.0 + 5

ATTENDANCE REQUIREMENTS

- A student must have 75% or more attendance in aggregate of delivered classes, in all registered courses of theory (lectures plus tutorial) and practicals (including workshops training, seminar, projects, industrial training etc.) of the concerned semester.

- Only such students who fulfill the above 75% attendance criteria will be permitted to appear in End Semester Examination (ESE).

- The cases of students having attendance less than 75% but more than or equal to 60% shall be reviewed by the University on a case to case basis as per the Ordinance.

- If a student’s attendance falls below 60%, for any reason including medical, he will not be allowed to appear in the ESE of any course registered in the semester. He will be awarded ‘F’ grades in all the courses of that semester.

- Calculation of attendance for determining the eligibility to appear in ESE will be based on the date of actual registration of the candidate, if late registration is permitted by the University.

COMPONENTS OF EVALUATION

Theory subject only

- In general, a course will have three components of evaluation viz. Continuous Assessment (CA), Mid-Semester Exams (MSE), and End-semester Exam (ESE),

- CA will carry 5 Marks, Assignments 15 Marks,

- MSE will carry 40 marks (Sum of Best Two MSE from Three)

- First MSE to be held after completion of 35% - 40% course coverage.

- Second MSE to be held after completion of 70% - 80% course coverage.

- ESE will carry 40 marks.
Theory subject with practical

- In general, a course will have four components of evaluation viz. Continuous Assessment (CA), Mid-Semester Exams (MSE), Mid semester practical and End-semester Exam (ESE) theory and Practical
- CA will carry 5 Marks, Assignments 10 Marks,
- MSE will carry 30 marks (Sum of Best Two MSE from Three)
- Mid semester practical (15)
- First MSE to be held after completion of 35% - 40% course coverage.
- Second MSE to be held after completion of 70% - 80% course coverage.
- ESE will carry 30 marks.
- End semester practical (10)

SYSTEM OF EVALUATION BASED ON BROAD BAND GRADES

- The University shall follow the Broad-band Grades systems for various PG programmes as specified in the respective Programme detail.
- The course credit (C), number of lectures, tutorials, practicals (L), (T), (P) in a course are related as \( C = (L + T + 0.5 \times P) \)
- The students will be awarded grades using relative grading in a course and result cards will show individual course grades, the course credits and the overall weighted performance indices such as SGPA (Semester Grade Point Average) and CGPA (Cumulative Grade Point Average).
- The following broadband letter grades will be used to report a student’s performance on a 10-point scale.
- The letter grades and their numerical equivalents on a 10-point scale (called Grade Points) are as follows:

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>A</th>
<th>AB</th>
<th>B</th>
<th>BC</th>
<th>C</th>
<th>D</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade Points</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>7</td>
<td>6</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>
• In addition to the above, there are three letter grades viz., I, S, and X which stands for Incomplete, Satisfactory, and Unsatisfactory, respectively.

• For courses with zero weightage (audit) only satisfactory (S)/ Unsatisfactory (X) grades are awarded.

• No student shall be awarded ‘A’ grade in any course unless he has secured a minimum of 80% marks in the total of all components of evaluation in that course.

• No students shall be awarded ‘F’ grade in any course if he has secured a minimum of 40% marks in the total of all components of evaluation in that course.

• In case a student repeats a particular course during summer semester along with his juniors, he will be awarded only up to a maximum of AB grade based on his current performance and the grade he obtained earlier.

• The statistical method shall invariably be used with marginal adjustment for the natural cut off if the number of students appearing in a course is 60 or more. The mean and standard deviation (σ) of marks obtained of all the students in a course shall be calculated and the grades shall be awarded to a student depending upon the marks and the mean and the standard deviation as per Table given below:

<table>
<thead>
<tr>
<th>Lower Range of Marks</th>
<th>Grade</th>
<th>Upper Range of Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean + 1.5 σ ≤</td>
<td>AB</td>
<td>&lt; Mean + 2.5 σ</td>
</tr>
<tr>
<td>Mean + 0.5 σ ≤</td>
<td>B</td>
<td>&lt; Mean + 1.5 σ</td>
</tr>
<tr>
<td>Mean - 0.5 σ ≤</td>
<td>BC</td>
<td>&lt; Mean + 0.5 σ</td>
</tr>
<tr>
<td>Mean - 1.5 σ ≤</td>
<td>C</td>
<td>&lt; Mean - 0.5 σ</td>
</tr>
<tr>
<td>Mean - 2.5 σ ≤</td>
<td>D</td>
<td>&lt; Mean - 1.5 σ</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>&lt; Mean - 2.5 σ</td>
</tr>
</tbody>
</table>
If the **number of students appearing in any course is less than 60**, the grades in that course will be awarded in the following manner:

<table>
<thead>
<tr>
<th>Marks Obtained in a course out of 100 (M)</th>
<th>Letter Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>85 &lt;= M &lt;= 100</td>
<td>A</td>
</tr>
<tr>
<td>75 &lt;= M &lt;= 84</td>
<td>AB</td>
</tr>
<tr>
<td>65 &lt;= M &lt;= 74</td>
<td>B</td>
</tr>
<tr>
<td>55 &lt;= M &lt;= 64</td>
<td>BC</td>
</tr>
<tr>
<td>50 &lt;= M &lt;= 54</td>
<td>C</td>
</tr>
<tr>
<td>40 &lt;= M &lt;= 49</td>
<td>D</td>
</tr>
<tr>
<td>M &lt;= 39</td>
<td>F</td>
</tr>
<tr>
<td>Incomplete</td>
<td>I</td>
</tr>
</tbody>
</table>

• A student may be awarded the grade ‘I’ (Incomplete) in a course if he has missed the ESE for a genuine reason.

• This grade must, however, be converted by the Faculty-In-Charge into an appropriate letter grade within ten days from the completion of ESE.

• Any ‘I’ grade still outstanding two days after the prescribed last date, shall be automatically be converted into ‘F’ grade.

• The course(s) in which a student has earned ‘F’ grade will be termed as back-log course(s), which he has to improve by repeating/ replacing the course(s) as per the rules.

• ‘F’ grade is also awarded to a student who is not allowed to/ do not appear in ESE in a particular subject due to shortage of attendance, though he might have undergone other components such as MSE, assignments, class tests, projects, etc.

• Such a student will be required to repeat the course in the Summer semester in which he has secured ‘F’ grade.

• The **Semester Grade Point Average** is a weighted average of the grade points earned by a student in all the courses credited and describes his academic
performance in a Semester. If the grade point associated with the letter grades awarded to a student are say, \( g_1, g_2, g_3, \ldots \) and the corresponding weightage is (credits) are say, \( w_1, w_2, w_3, \ldots \) the SGPA is given by:

The **Cumulative Grade Point Average** indicates overall academic performance of a student in all the courses registered up to and including the latest completed Semester. It is computed in the same manner as SGPA, considering all the courses (say, \( n \)), and is given by:

\[
\text{CGPA} = \frac{\sum (\text{credit of semester} \times \text{SGPA of semester})}{\text{total credits}}
\]

- The minimum CGPA requirement for the award of an Post Graduate degree/ diploma/ certificate will be 5.5 subject to getting ‘D’ or above grade in each of the courses individually.
- A minimum of 4.5 SGPA in a UG programme is required in each semester for moving to the higher semester.
- A student will not be allowed to move to higher Semester without clearing the backlog courses so as to obtaining the required minimum SGPA and/or CGPA.
- A student will be required to get grade ‘D’ or above in a course for passing in the course.
- If a student receives an ‘F’ grade in a PE course, he is permitted to take another PE course from the same group on payment on prescribed fee, instead of the PE course the student had failed to clear, in a subsequent semester and clear the new PE course.
- If a student receives an ‘F’ grade in a OE course, he is permitted to take another OE course on payment on prescribed fee instead of the OE course the student had failed to clear, in a subsequent semester and clear the new course.
- Further, the student is also permitted to choose a PE course from his curriculum, instead of the OE course that the student had failed to clear.
- Such course substitution option can be exercised only once, either for a PE or OE, for the entire duration of the Programme.
- Course Substitution is not permitted for OC or PC courses.
- A student will be issued a Cumulative Grade Card at the end of each semester indicating the grades secured for all the registered courses up to and including the last semester.
EXAMINATION

• The period of Examination(s) (Mid semester and End semester) shall be as specified in the Academic Calendar.

• All students who have registered for a particular course are eligible to write the ESE of that course, except if he is declared ineligible due to one or more of reasons listed below.
  1. Shortage of attendance
  2. Acts of indiscipline
  3. Withdrawal of a course from Registration

• Make-up examinations are special examinations conducted for students who could not take regularly scheduled examination and have been awarded the ‘I’ grade or ‘Incomplete’ result.

• Make-up examination is a special privilege to be offered at the discretion of the University and the University will not be under any obligation to allow a student a make-up examination. The student(s) shall have no right to cite the non-availability of this facility as an excuse for his/their poor performance.

• Make-up Examination for MSE and/or ESE may not be allowed to students on disciplinary probation

• A student, who has missed one or more papers in a regular examination because of a genuine medical reason, may be permitted in Make-up Examination as per rules.

• A student appearing in a make-up examination for ESE and/or MSE in any course shall not be awarded ‘A’ grade in that course.

• After valuation of MSE answer scripts, they will be handed over to students.

• Recounting of ESE answer scripts is permitted.

• There is no provision of re-evaluation of ESE answer scripts.
TERMINATION OF THE PROGRAMME

A student will be declared “Not Fit for the Programme (NFP)” and shall have to discontinue if he does not satisfy following conditions:

After the completion of the First Year the student should have passed a minimum of forty percent (40%) courses prescribed in the first year to be calculated after the summer semester, if any.

Second Year onwards, the academic performance of a student is reviewed at the end of every semester by the Academic Advisory Committee, and the decision is taken on a case to case basis as per rules.

MAXIMUM DURATION FOR THE COMPLETION OF THE PROGRAMME

(i) The maximum duration for completion of the degree/ diploma/ certificate, for the completion of the course, subject to other conditions, shall be as follows:

<table>
<thead>
<tr>
<th>Normal Duration</th>
<th>Maximum Duration Allowed</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Years</td>
<td>5 Years</td>
</tr>
</tbody>
</table>

RESULT AND DIVISION

• A student will be issued a Cumulative Grade Card at the end of each semester indicating the grades secured for all the registered courses up to and including the last semester.

• The minimum CGPA requirement for the award of an Post Graduate degree/ diploma/ certificate/ integrated programme will be 5.5 subject to getting ‘D’ or above grade in each of the courses individually.

• The result of a student may be withheld if,

  (1) He has not paid all the dues, or

  (2) If there is a case of indiscipline or use of unfair means or of academic misconduct pending against him, or

  (3) Any other reason as deemed fit by the University.

• Four divisions as defined below shall be awarded:
<table>
<thead>
<tr>
<th>Division</th>
<th>CGPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>First with Honors and Certificate of Merit</td>
<td>≥ 9.0</td>
</tr>
<tr>
<td>First with Honours</td>
<td>≥ 8.0 &lt; 9.0</td>
</tr>
<tr>
<td>First</td>
<td>≥ 6.5 &lt; 8.0</td>
</tr>
<tr>
<td>Second</td>
<td>≥ 5.0 &lt; 6.5</td>
</tr>
</tbody>
</table>

• For securing degree/diploma/certificate in **First Division with Honors** and **First Division with Honors and certificate of Merit**, a student shall have passed all the courses (Theory and Practical) of the programme in the **first attempt**, i.e., without ever being awarded a Re-appear or a Fail.

**MAINTENANCE OF DISCIPLINE AMONG STUDENTS**

• All powers relating to maintenance and enforcement of discipline in the University and taking disciplinary action against the students and employees of the University shall vest in the Vice-Chancellor, which he may delegate as he deems proper.

• All acts given in details in Ordinance shall amount to acts of indiscipline or misconduct or ragging on the part of a student of the University and colleges/institutions.

• The University Authority in the exercise of the powers, order or direct that any student –
  
  (a) be expelled from the University, college or institution, or
  
  (b) be, for a stated period, rusticated or
  
  (c) be not, for a stated period, admitted to a course or courses of study of the University; or
  
  (d) be imposed with the fine of a specified amount of money;
  
  (e) be debarred from taking a University examination or examinations for one or more years.
ACADEMIC MISCONDUCT AND USE OF UNFAIR MEANS

• Plagiarism, collusion and cheating are all forms of academic misconduct and use of unfair means as defined in the Examination Ordinances.

• In case the student has come to examination under the influence of any intoxicating material, misbehaves with one or more members of the supervisory staff, it will also be treated as an act of Unfair Means and academic misconduct.

• In relation to continuous assessment, Academic misconduct and use of Unfair Means is classified as Major Misconduct or Minor Misconduct as described below:

  (1) **Major Misconduct**: Where plagiarism, collusion or cheating is detected in Thesis, Dissertation or Major Project of a programme.

  (2) **Minor Misconduct**: All other academic misconduct excluding those defined in major misconduct will be regarded as a minor misconduct and will be dealt accordingly.

• If the Unfair Means Board (UFMB) finds the student guilty, one of the following actions may be taken:

  (1) The student may be disqualified for one or more semester, or
  (2) The student may be rusticated for one or more semester, or
  (3) The academic programme of the student may be terminated.
  (4) Any other action as deemed fit by the UMB.

RESIDUAL PROVISION

In case of any dispute/ difference of interpretation of provisions made in the Ordinances and Regulations, the decision of the Chancellor shall be final.
Bachelor of Science in Radiology and Imaging Technology (IECU-BRIT)

COURSE STRUCTURE

Year - I

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Course Code</th>
<th>Subject</th>
<th>Contact Hr</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BPT 101</td>
<td>Anatomy</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>BPT 102</td>
<td>Physiology</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>BRT101</td>
<td>Fundamental of Medical Imaging &amp; Radiotherapy</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>HUM-111</td>
<td>Foundation English</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>FC-111</td>
<td>Fundamentals of Computers</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>BRT102</td>
<td>Basics Radiation Physics</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>BPT151</td>
<td>Anatomy (Practical ) *</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>BPT152</td>
<td>Physiology ( Practical ) *</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>BRT151</td>
<td>Fundamental of Medical Imaging &amp; Radiotherapy (Practical ) *</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>BRT191</td>
<td>Hospital Postings</td>
<td>4</td>
<td>4</td>
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<tr>
<td></td>
<td><strong>Total</strong></td>
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<td>32</td>
<td>27</td>
</tr>
</tbody>
</table>

* = Alternate week in batches

Year - II

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Course Code</th>
<th>Subject</th>
<th>Contact Hr</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BRT-201</td>
<td>Advanced Radiographic Techniques</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>BRT-202</td>
<td>Radiation Physics &amp; Radiation Protection</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>BRT-203</td>
<td>Equipments of Radiotherapy</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>BRT-204</td>
<td>Special Radiographic Technique &amp; Procedures</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>BRT-205</td>
<td>Medical Biochemistry</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>BRT-251</td>
<td>Advanced Radiographic Techniques ( Practical ) *</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>BRT-252</td>
<td>Special Radiographic Technique (Practical)</td>
<td>2</td>
<td>1</td>
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<tr>
<td>8</td>
<td>BRT-253</td>
<td>Medical Biochemistry (Practical)*</td>
<td>2</td>
<td>1</td>
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<tr>
<td>9</td>
<td>BRT-291</td>
<td>Hospital Postings</td>
<td>4</td>
<td>4</td>
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<tr>
<td></td>
<td><strong>Total</strong></td>
<td></td>
<td>30</td>
<td>27</td>
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</tbody>
</table>
Year III

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Course Code</th>
<th>Subject</th>
<th>Contact hr</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BRT301</td>
<td>Radiotherapy Planning and Quality Control</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>BRT302</td>
<td>Equipment of Radio Diagnosis</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>BRT303</td>
<td>Interventional Radiology &amp; Drugs Used in Diagnostic Radiology</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>BRT304</td>
<td>Radiotherapy &amp; Brachy-therapy Techniques in Malignant and Non-Malignant Diseases</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>BRT305</td>
<td>Orientation in Para-Clinical Sciences</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>BRT306</td>
<td>Orientation in Clinical Sciences</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>BRT307</td>
<td>Community Healthcare</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>BRT351</td>
<td>Radiotherapy Planning and Quality Control (Practical)</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>9</td>
<td>BRT352</td>
<td>Equipment of Radio Diagnosis (Practical)</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>BRT353</td>
<td>Interventional Radiology &amp; Drugs Used in Diagnostic Radiology (Practical)</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>11</td>
<td>BRT391</td>
<td>Hospital Postings</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>31</strong></td>
<td><strong>28</strong></td>
</tr>
</tbody>
</table>

Total credits= 82

**Question Paper Structure**

1. The question paper shall consist of eight questions. First question shall be of short answer type and be compulsory. It shall contain 8 parts, covering entire syllabus and the student shall be required to answer any five of them (weightage 4 marks each).

2. Out of the remaining seven questions, student shall be required to attempt any five. The weightage of Question No. 2 to 8 shall be 10 marks each.
SYLLABUS

1st YEAR
Anatomy

1. General Anatomy:
Introduction to Anatomy, terms and terminology. Regions of Body, Cavities and systems.
Surface anatomy – musculo-skeletal, vascular, cardiopulmonary system General Embryology.
Applied anatomy.
Musculoskeletal system:
Connective tissue & its modification, tendons, membranes, special connective tissue.
Bone structure, blood supply, growth, ossification, and classification. Muscle classification, structure and functional aspect.
Joints – classification, structures of joints, movements, range, limiting factors, stability, blood supply, nerve supply, dislocations and applied anatomy.

2(a). Upper extremity:
Bony architecture
Joints – structure, range of movement
Muscles – origin, insertion, actions, nerve supply
Major nerves – course, branches and implications of nerve injuries Development of limb bones, muscles and anomalies
Radiographic identification of bone and joints Applied anatomy

2(b). Lower Extremity:
Bony architecture
Joints – structure, range of movement
Muscles – origin, insertion, actions, nerve supply
Major nerves – course, branches and implications of nerve injuries Development of limb bones, muscles and anomalies
Radiographic identification of bone and joints Applied anatomy

2(c). Spine and thorax:
Back muscles - Superficial layer, Deep muscles of back, their origin, insertion, action and nerve supply.
Vertebral column – Structure & Development, Structure & Joints of vertebra Thoracic cage
Radiographic identification of bone and joints Applied anatomy

2(d). Head and neck: Cranium
Facial Muscles – origin, insertion, actions, nerve supply Temporal
mandibular Joints – structure, types of movement

3. Nervous system:
Classification of nervous system
Nerve – structure, classification, microscopy with examples. Neurons, classification with
examples. Simple reflex arc.

Parts of a typical spinal nerve/Dermatome:
Central nervous system – disposition, parts and functions Cerebrum
Cerebellum, Midbrain & brain stem
Blood supply & anatomy of brain
Spinal cord- anatomy, blood supply, nerve pathways Pyramidal, extra pyramidal system, Thalamus, hypothalamus
Structure and features of meninges Ventricles of brain, CSF circulation
Development of nervous system & defects
Cranial nerves – (course, distribution, functions and palsy) Sympathetic nervous system, its parts and components
Parasympathetic nervous system Applied anatomy

4. Sensory system
Structure and function of Visual system, Auditory system, Gustatory system, Olfactory system, Somatic sensory system

5. Cardiovascular system
Circulatory system – major arteries and veins of the body, structure of blood vessels
Heart structure, positions, chambers, valves, internal & external features Blood supply to heart
Conductive system of heart

6. Lymphatic system:
Circulation, structure & functions Lymph nodes

7. Respiratory system:
Structure of upper and lower respiratory tract Thorax:
Pleural cavities & pleura Lungs and respiratory tree Heart and great vessels
Diaphragm

8. Digestive system
Parts of digestive system
Abdominal cavity – divisions Muscles of abdominal wall
Liver
Pancreas Spleen
Alimentary canal Gall bladder
Intestine (small & large)

9. Urinary and Reproductive system Urinary system
Pelvic floor, innervations Kidney, Ureter, bladder, urethra
Genital system – male and female:
Reproductive system of male
Reproductive system of female
10. Endocrine system Pituitary gland Thyroid
Parathyroid

PRACTICAL

1. Identification and description of all anatomical structures.

2. The learning of Anatomy is by demonstration only through dissected parts, slides, models, charts, etc.

3. Demonstration of dissected parts (upper extremity, lower extremity, thoracic & abdominal viscera, face and brain).

4. Demonstration of skeleton- articulated and disarticulated.

5. During the training more emphasis will be given on the study of bones, muscles, joints, nerve supply of the limbs and arteries of limbs.


Points of palpation of nerves and arteries
I\textsuperscript{st} YEAR

PHYSIOLOGY

1. General Physiology:
Cell: morphology, Structure and function of cell organelles Structure of cell membrane Transport across cell membrane Intercellular communication Homeostasis

2. Blood:

3. Cardiovascular system:
Conducting system-components, impulse conduction Heart valves Cardiac cycle- definition, phases of cardiac cycle Cardiac output- definition, normal value, determinants. Stroke volume and its regulation Heart rate and its regulation: Arterial pulse, Blood pressure-definition, normal values, factors affecting blood pressure Shock-definition, classification, causes and features Basic idea of ECG Cardiovascular changes during exercise

4. Respiratory System:
Mechanics of respiration Lung volumes and capacities Pulmonary circulation, transport of respiratory gases Factors affecting respiration Regulation of respiration-neural regulation, voluntary control and chemical regulation Hypoxia, Hypercapnoea, Hypocapnoea Artificial respiration Disorders of respiration- dyspnoea, orthopnoea, hyperpnoea, hyperventilation, apnoea, tachypnoea Respiratory changes during exercise.

5. Nerve Muscle Physiology:
Muscles- classification, structure, properties, Excitation contraction coupling Motor unit, EMG, factors affecting muscle tension, Muscle tone, fatigue, exercise Nerve –structure and function of neurons, classification, properties Resting membrane potential & Action potential their ionic basis All or None phenomenon Neuromuscular transmission Ionic basis of nerve conduction Concept of nerve injury & Wallerian degeneration Synapses
Electrical events in postsynaptic neurons Inhibition & facilitation at synapses
Chemical transmission of synaptic activity Principal neurotransmitters.

6. Nervous system:
Introduction, central and peripheral nervous system, functions of nervous system
Reflexes- monosynaptic, polysynaptic, superficial, deep & withdrawal reflex Sense organ, receptors, electrical & chemical events in receptors
Sensory pathways for touch, temperature, pain, proprioception & others
Control of tone & posture: Integration at spinal, brain stem, cerebellar, basal ganglion levels, along with their functions
Spinal cord lesions- complete transection & hemi section of the spinal cord Autonomic nervous system : features and actions of parasympathetic & sympathetic nervous system Hypothalamus
Higher functions of nervous system Special senses- eye, ear, nose, mouth
Water excretion, concentration of urine-regulation of Na⁺, Cl⁻, K⁺ excretion
Physiology of urinary bladder

7. Renal System:
Physiology of kidney and urine formation Glomerular filtration rate, clearance, Tubular function

8. Digestive System:
Digestion & absorption of nutrients, Gastrointestinal secretions & their regulation Functions of Liver & Stomach.

9. Endocrinology
Physiology of the endocrine glands – Pituitary, Pineal Body, Thyroid, Parathyroid, Adrenal, Gonads, Thymus, Pancreas. Hormones secreted by these glands, their classifications and functions.

10. Male & female reproductive system
Male - Functions of testes, pubertal changes in males, testosterone - action & regulations of secretion.
Female - Functions of ovaries and uterus, pubertal changes, menstrual cycle, estrogens and progestron - action and regulation.
PRACTICAL

1. Examination of pulse, B.P., Respiratory rate.
2. Reflexes
3. Spirometry to measure various lung capacities & volumes, Respiratory rate, Tidal volume, IRV, IC, ERV, EC, residual volume on Spirometry.
4. Estimate of Haemoglobin, R.B.C., W.B.C., TLC, DLC, ESR count.

1st YEAR

Fundamental of Medical Imaging & Radiotherapy

Course Contents:

The X-Ray machine

1. X-ray Production, Emission & Interactions with Matter
2. Radiographic Film, latent Image, Intensifying Screens, Grids
3. Radiographic Exposure, Film Developing & Processing, Radiographic Quality
5. Acoustic Intensity, Reflection, Impedance & Absorption
6. Ultra Sound Transducer, Beam, Operational Modes & Biological Effects.
8. Physical Principles of Magnetic Resonance Imaging: Basic concept, System Components, Biological Hazards, Advantage over CT

Reference Books:

2. Krishnamurthy, Medical Radiographic Technique and Dark Room Practice
3. Rehani, Diagnostic Imaging and Quality Assurance
4. Chesney and Chesney, Radiographic Imaging

* Latest editions of all the suggested books are recommended.
FOUNDATION ENGLISH

Course code: HUM-111

Unit I
Pre-Requisites of written Communication: One word substitution, Idioms and Phrases, Capital letters(use), Abbreviation, Antonyms, Synonyms, Word formation: prefix, suffix, Transformation of sentences: Interrogative to assertive & to negative & vice-versa.

Unit II
Reading Skills: Characteristics of reading, Types of reading, Purpose of reading, Process of reading, Rules for faster comprehension, Approach to reading, SQ3R, Comprehension (Unseen passage).

Unit III
Writing skills: Report writings – Meaning and Introduction, Characteristics, Types, Business letters: Quotations and Tenders, Notice, Memorandum, Job Application Letter, Resume Writing, E-mail writing, Paragraph writing.

Unit IV

Practical syllabus-

a) Group Discussion
b) Just a minutes session: Speaking Extempore for one minutes on given topics
c) Reading aloud of newspaper headlines and important articles.
d) Improving pronunciation through tongue twisters.
e) Mannerism or Etiquette.
f) Mock Interview

Reference Books:
Fundamentals of Computer  (FC-111)

UNIT-I
Introduction to Computers: Definition of Computer; Components of Computer; Characteristics of Computers; History evolution of Computers; Generation of computers; Classification of Computers: According to Purpose, According to Technology, According to Size and Storage Capacity; Human being VS Computer; Difference between Computer and Calculator.

UNIT-II
Input Devices: Mouse, Keyboard, Light pen, Track Ball, Joystick, MICR, Optical Mark reader and Optical Character reader. Scanners, Voice system, Web, Camera.
Memory and Mass Storage Devices: Characteristics of Memory Systems; Memory Hierarchy; Types of Primary Memory; RAM and ROM; Secondary and Back-up; Magnetic Disks, Characteristics and classification of Magnetic Disk, Optical Disk, Magnetic Tape.

UNIT-III

UNIT IV

UNIT V
Presentation using MS-PowerPoint: Presentations, Creating, Manipulating & Enhancing Slides, Organizational Charts, Excel Charts, Word Art, Layering art Objects, Animations and Sounds, Inserting Animated Pictures or Accessing through Object, Inserting Recorded Sound Effect or In-Built Sound Effect.
**TEXT BOOKS**

2. Dromey, R.G., How to Solve it By Computer, PHI

**REFERENCE BOOKS**

3. Leon, Alexis & Leon, Mathews, Introduction to Computers, Leon Tech World
4. Rajaraman, V., Fundamentals of Computers, PHI
5. Ram, B., Computer Fundamentals, Architecture & Organization, New Age International (P) Ltd.
Ist YEAR
Basics Radiation Physics

Course Contents:

Fundamental of Physics

1. Matter & energy
2. Radiation & spectra
3. Electricity and Magnetism
4. Atoms & nuclei
5. Radioactivity

X-rays

1. Production
2. Properties
3. Measurement
4. Interaction of X-rays- Gamma rays and electron radiation with matter and principles of differential absorption in biological materials.

Reference Books:
1. K.Thalayan, Basic of Radiological Physics
2. K.Thalayan, Textbook of Radiological Safety
3. Rehani, Advance Medical Physics

*Latest editions of all the suggested books are recommended.

Ist YEAR
Fundamental of Medical Imaging & Radiotherapy (Practical)

Course Contents:

Practical/Clinical posting

1. X-ray tubes general features and mobile equipments.
2. Care and maintenance of X-ray equipments and image intensifier
3. To study effects of Kilo Voltage Peak (KVP) and Milli Ampere Second (MAS)
4. To check the safety of dark room.
5. To check the speed of intensifying screen.
6. To check the developing time test and function.
7. Silver recovery method
Reference Books:
1. Rehani, Diagnostic Imaging and Quality Assurance
2. Chesney and Chesney, Radiographic Imaging

* Latest editions of all the suggested books are recommended.

Ist YEAR

Hospital Postings

Course Contents:

Students shall be deputed to various labs of Radiology department wherein they shall undergo practical training of handling patients, collection and processing of investigation (X Ray, Special procedures, CT Scan, MRI, Ultrasound etc) and equipment.

Identification of patient’s particulars based on CR number, Lab Number and transfer of samples from collection to different labs.

Process of performing various tests in different labs

Each student is required to maintain a logbook of the various posting. Student’s performance shall be evaluated on continuous basis by the faculty posted in various sections. The faculty shall submit the assessment records of each student posted in his/her section on monthly basis to the HOD. Marks will be awarded out of 50.

IInd YEAR

Advanced Radiographic Techniques

Course Contents:

Ultra Sound

1. Principle of Ultra Sound
2. Types of Ultra sound
3. Description of Equipment
4. Indication and clinical Application
CT Scan

1. Basic principle of CT scan
2. Description of Equipment
3. Conventional CT Scan
4. Indications and Contra Indications

Course contents:

1. Preparation of Patients
2. Contrast Media
3. Indication and Contraindication
4. Clinical application
5. Procedure
6. MR Angiography

Reference Books:
1. Chapman, Radiological Procedure
2. Bhushan L Lakkar, Radiological Procedure
3. Clark, Radiological Procedure
4. Kartikeyan, Step by Step CT Made Easy

* Latest editions of all the suggested books are recommended.

II\textsuperscript{nd} YEAR

Radiation Physics and Radiation Protection

Course Contents:

RADIATION PHYSICS

1. Atomic structure as applied to generation of X-rays and radioactivity spectrum of diagnostic imaging and therapy X ray.
2. Effects of variation of tube voltage current, filtration, III waveform and target material on X-ray production lows of radioactivity and decay schemes of different alpha, Beta, gamma ray. Megatron and position emitters as used in medicine especially in radiotherapy.
3. Artificial radionuclide generators employed in medicine in general and radiotherapy sources in particulars.
4. Interaction of radiation with matter attenuation absorption and scattering phenomena.
5. Photoelectric absorption Compton scattering pair-production and annihilation process ionization, effects of geometry of thickness of the absorber. Dependence on the nature and atomic number of the absorber and on radiation quality.
6. Transmission of X-ray through body tissues linear energy transfer.
7. Range of secondary electrons and electron build up relative amount of scatter from homogeneous and homogonous beam defining the passage through a patient.
8. Physical requirements of beam defining devices e.g. cones, diaphragm, collimators etc.
9. Units of radiation measurements specification of quality and half- valve thickness (HIV) and its measurements, filters and filtration.
11. Radiation detectors and their principles of working.
12. Definition of ‘Bragg-peak’, percentage depth dose, peak scatter factor, tissue air-ratio, tissue maximum ratio, scatter air ratio, isodose curves and radiation penumbra of different beams.
13. Wedge filters, wedge angle, hinge angle.
15. Physical properties of phantom materials, bolus and substitutes.
16. Factor used for treatment dose calculations, Daily treatment time and monitor units calculation method physical aspects of electron and neutron therapy.

RADIATION PROTECTION

1. Definition of radiation hazards maximum permissible dose and annual limit of intake (ALI) permissible dose levels on and around sealed source housing and installation principles of radiation protection and MPD of different ICRP rules, stochastic and non-stochastic effects.
2. Importance of ‘ALARA’ physical principles of design and planning of installation safe work practice in teletherapy and brachytherapy.

Reference Books:

1. Rehani, Advance Medical Physics
2. Faiz M Khan, Radiation Physics

* Latest editions of all the suggested books are recommended.

II\textsuperscript{nd} YEAR

\textbf{Equipment of Radiotherapy}

Course Contents:

1. Orthovoltage equipment with special reference to physical design equipment of tube and its accessories and interlocks, gamma ray sources used radiotherapy especially cobalt 60 source its construction and source housing and handling mechanism.
3. Salient features of components of Linear Accelerator like tube design, wake guide, target
design, beam bending system.
4. Radio-frequency generators like magnetron and klestron.
5. Basic principle of remote after-loading system/machines and sources used.
7. Sterofoam template cutting system introduction to radio-surgery.
8. Equipment and dosimetry equipment.

Reference Books:

1. Krishan, Step by Step Management of Chemo and Radiotherapy
2. Lele, Principle and Practice of Nuclear Medicine and Correlative Medical Imaging
3. Faiz M Khan, Textbook of Radiotherapy

* Latest editions of all the suggested books are recommended.

II\textsuperscript{nd} YEAR
Special Radiographic Technique & Procedures

Course Contents:

1. Special procedure and related Contrast Media
   - Contrast Media
   - Emergency in Radiology Department
   - Excretory System
     a) IVP
     b) RGU
     c) MCU
   - Oral Cholecystography
   - Percutaneous Trans hepatic Cholecystography
   - G.I. Tract
     a) Barium Swallow
     b) Barium Meal Series
     c) Barium Meal Follow Through
     d) Barium Enema
   - Hystero Salpingoraphy
   - Angiography
   - Tomography
2. Radiography of body parts and their poisoning
   - Upper limb
   - Lower limb
   - Abdomen, Head and Neck
3. Guideline for design and location of X-ray equipments
4. Dark Room designing
   - Outline structure of Dark Room
   - Material used
• Miscellaneous

Reference Books:
1. Clark, Radiographic Positioning and Special Procedure
2. Chapman, Radiological Procedure
3. Krishnamurthy, Medical Radiographic Technique & Darkroom Practice

* Latest editions of all the suggested books are recommended.

II\textsuperscript{nd} YEAR
Medical Biochemistry

Course Contents:

1. Specimen Collection

Pre-analytical variables, Collection of blood, Collection of CSF & other fluids, Urine collection. Use of preservatives, Anticoagulants

2. Introduction to Laboratory Apparatus

Pipettes- different types (Graduated, volumetric, Pasteur, Automatic etc.), Calibration of glass pipettes, Burettes, Beakers, Petri dishes, depression plates. Flasks - different types) Volumetric, round bottomed, Erlenmeyer conical etc.). Funnels – different types (Conical, Buchner etc.) Bottles: Reagent bottles – graduated and common, Wash bottles – different types, Specimen bottles etc.

**Measuring cylinders, Porcelain dish**, Tubes – Test tubes, centrifuge tubes, test tube draining rack Tripod stand, Wire gauze, Bunsen burner. Cuvettes, significance of cuvettes in colorimeter, cuvettes for visible and UV range, Cuvette holders Racks – Bottle, Test tube, Pipette, Desiccators, Stop watch, rimers, scissors, Dispensers – reagent and sample.

Any other apparatus which is important and may have been missed should also be covered

3. Maintenance of Lab Glassware and Apparatus

Glass and plastic ware in Laboratory, use of glass: significance of boro silicate glassware and cleaning of glassware, different cleaning solutions of glassware and cleaning of plastic ware, different cleaning solutions.

4. Instruments (Theory and demonstration)

Water bath: Use, care and maintenance, Oven & Incubators: Use, care and maintenance. Water Distillation plant and water deionizers. Use, care and maintenance, Refrigerators,
cold box, deep freezers – use, care and maintenance. Reflux condenser: Use, care and maintenance. Centrifuges (Theory and demonstration) Diagrams to be drawn

Definition, Principle, Svedberg unit, centrifugal force, centrifugal field rpm, ref. Conversion of G to rpm and vice versa. Different types of centrifuges, Use care and maintenance of a centrifuge. Laboratory balances (Theory & Practical) Diagrams to be drawn. Manual balances: Single pan, double pan, trip balance, Direct read out electrical balances. Use care and maintenance. Guideline to be followed and precautions to be taken while weighing. Weighing different types of chemicals, liquids. Hygroscopic compounds etc. Colorimeter and spectrophotometer (Theory and Practical) Diagrams to be drawn. Principle, Parts diagram. Use, care and maintenance of pH meter and electrodes, Guidelines to be followed and precautions to be taken while using pH meter

5. Conventional and SI Units
Preparation of normal solutions e.g., In Na₂CO₃, O In Oxalic acid, 0.1N HCl, 0.1N H₂SO₄, 0.66 N H₂SO₄ etc. Percent solutions. Preparation of different solutions – v/v w/v (solids, liquids and acids). Conversion of a percent solution into a molar solution.

6. Dilutions
Diluting solutions: e.g. Preparation of 0.1N NaCl from 1N NaCl from 2N HCl etc., Preparing working standard from stock standard, Body fluid dilutions, Reagent dilution techniques, calculating the dilution of a solution, body fluid reagent etc., Saturated and supersaturated solutions.
Standard solutions: Technique for preparation of standard solutions e.g. Glucose, urea, etc., Significance of volumetric flask in preparing standard solutions. Volumetric flasks of different sizes, Preparation of standard solutions of deliquescent compounds (CaCl₂, potassium carbonate, sodium hydroxide etc.,) Preparation of standards using conventional and SI units.

Salts – Definition, classification, water of crystallization – definition and different types, deliquescent and hygroscopic salts.

Acid-base indicators: (Theory and Practical) Definition, concept, mechanism of dissociation of an indicator, colour change of an indicator in acidic and basic conditions, use if standard buffer solution and indicators for pH determinations, preparation and its application, list of commonly used indicators, and their pH range, suitable pH indicators used in different titrations, universal indicators.

Quality control: Accuracy, Precision, Specificity, Sensitivity. Limits of error allowable in laboratory, Percentage error, Normal values and Interpretations, pH Regulation,

**Reference Books:**

1. Varley, Clinical Chemistry
2. Teitz, Clinical Chemistry
3. Kaplan, Clinical Chemistry
4. Ramakrishna S, Prasanna KG, Rajna, Text Book of Medical Biochemistry, Orient Longman
7. Chatterjee, A Text Book of Medical Biochemistry
8. U. Satyanarayan, Medical Biochemistry

*Latest editions of all the suggested books are recommended.*

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**II\(^{nd}\) YEAR**  
**Advanced Radiographic Techniques (Practical)**

**Course Contents:**
Based on Theory

**Reference Books:**
1. Chapman, Radiological Procedure
2. Bhusan L Lakkar, Radiological Procedure
3. Clark, Radiological Procedure
4. Kartikeyan, Step by Step CT Made Easy

*Latest editions of all the suggested books are recommended.*
II\textsuperscript{nd} YEAR
Special Radiographic Technique & Procedures (Practical)

**Course Contents:**
1. Radiography in various positions for all the special radiological procedures, using contrast media as per syllabus.
2. Positioning and treatment of various cases patients by using:
   a) Prescribed filters and wedges
   b) Protection of various organs

**Reference Books:**
1. Clark, Radiographic Positioning and Special Procedure
2. Chapman, Radiological Procedure
3. Krishnamurthy, Medical Radiographic Technique & Darkroom Practice

*Latest editions of all the suggested books are recommended.*

II\textsuperscript{nd} YEAR
Medical Biochemistry (Practical)

**Course Contents:**
1. Analysis of Normal Urine
2. Liver Function tests
3. Lipid Profile
4. Renal Function test
5. Blood gas and Electrolytes
6. Demonstration of Glucometer with strips

**Reference Books:**
2. Chatterjee, A Text book of Medical Biochemistry
3. Satyanarayan, U., Medical Biochemistry

*Latest editions of all the suggested books are recommended.*
II\textsuperscript{nd} YEAR
Hospital Postings

Course Contents:

Students shall be deputed to various labs of Radiology department wherein they shall undergo practical training of handling patients, collection and processing of investigation (X Ray, Special procedures, CT Scan, MRI, Ultrasound etc) and equipment.

Identification of patient’s particulars based on CR number, Lab Number and transfer of samples from collection to different labs.

Process of performing various tests in different labs

Each student is required to maintain a logbook of the various posting. Student’s performance shall be evaluated on continuous basis by the faculty posted in various sections. The faculty shall submit the assessment records of each student posted in his/her section on monthly basis to the HOD. Marks will be awarded out of 50.

* Latest editions of all the suggested books are recommended.

III\textsuperscript{rd} YEAR
Radiotherapy Planning and Quality Control

Course Contents:

1. Definition of treatment planning.
2. Planning procedure in general with special emphasis on turnout localization and target volume measurement by conventional radiographic method and simulator imaging.
3. Role of special contrast medium base radiotherapy.
4. CT/MRI/Ultrasound/ radionuclide imaging methods physical and clinical requirements of field selection of treatment in Teletherapy, role of portal films in treatment planning. Choice of central axis percentage depth dose data and isodose curve form a spectrum of radiotherapy beams used treatment.
5. Requirement and practice of organ shielding single multiple fields, and rotational field therapy, planning procedures.
6. Computerized treatment planning system choice of dose, time and fraction.
7. Safety of critical organs in planning methods, Role of treatment shell immobilization devices and laser in patients set up and positioning
8. Acceptance tests on therapy simulator telescope megavoltage X-ray and electron beam
machines.

Reference Books:
1. Mohanti, A Textbook of Radiation Oncology
2. K.Thalayan , Textbook of Radiological Safety
3. Faiz M Khan, Textbook of Radiotherapy and Treatment Planning

* Latest editions of all the suggested books are recommended.

IIIrd YEAR
Equipments of Radio Diagnosis

COURSE CONTENTS:
1. Equipments and description
2. Color Doppler, Flow Imaging
3. Indication
4. Clinical Application

CT SCAN

COURSE CONTENTS:
1. Advancement in CT
2. Spiral CT
3. Preparation opt Patient
4. Contrast Media
5. Indication and Contraindication
6. Technical Aspects of various procedures in CT

NUCLEAR MEDICINE & PET SCAN

COURSE CONTENTS:
1. Nuclear medicines, PET scan and Mammography
   a) Definition
   b) Characteristic of Radio Nuclide
   c) Commonly used Radio Nuclides
   d) Description of Equipment

Reference Books:
1. Lele, Principle and Practice of Nuclear Medicine and Correlative Medical Imaging
2. Satish K Bhargava, CT Imaging
3. Singh Haripal, Atlas of Human Anatomy on CT Imaging

* Latest editions of all the suggested books are recommended.

**IIIrd YEAR**

**Interventional Radiology & Drugs Used in Diagnostic Radiology**

**Course Contents:**

1. Special procedure and related Contrast Media
   a) Contrast Media
   b) Emergency in Radiology Department
   c) Excretory System
      i. IVP
      ii. RGU
      iii. MCUG
   a) ORAL Cholecystography
   b) Percutaneous
   c) G.I. Tract
      i. Barium Swallow
      ii. Barium Meal Series
      iii. Barium Meal Follow Through
      iv. Barium Enema
   a) Hystero Salpingography
   b) Angiography
   c) Tomography
2. Guideline for design and location of X-ray equipments
3. Dark Room designing
   a) Outline structure of Dark Room
   b) Material used
   c) Miscellaneous

**INTERVENTIONAL RADIOLOGY**

1. Interventional Radiology
   a) Definition
   b) Indication
   c) Clinical Application
   d) Name of different type of procedure

**ANAESTHESIA IN DIAGNOSTIC RADIOLOGY**

1. Facilities regarding general Anesthesia in the X-ray Department.
2. Anesthetic Problems associated with specific technique-
a) Vascular Studies
b) Carotid Angiography
c) Venography
d) T and NMR

Reference Books:
1. Chapman, Radiological Procedure
2. Bhushan L Lakkar, Radiological Procedure
3. Clark, Radiological Procedure
4. Kartikeyan, Step by Step CT Made Easy

* Latest editions of all the suggested books are recommended.

IIIrd YEAR
Radiotherapy & Brachytherapy Techniques in Malignant and Non-Malignant Diseases

Course Contents:

1. Orthovoltage techniques in skin tumours, and cancers of the breast Advantages and disadvantages of orthovoltage in radiotherapy.
2. Tele isotope cobalt therapy techniques in skin and deep sealed tumours parallel opposed fields and small beam directed therapy and wedge field techniques in head and neck tumours especially cancers of larynx treatment techniques for cancer of maxillary antrum and pituitary tumours.
3. Treatment techniques in cancer of breast by telecobalt and low energy megavoltage X-rays and electron beam.
4. Tele and brachy-therapy techniques of treatment of different stages of carcinoma cervix uteri with special emphasis on HDR and LDR brachytherapy.
5. Three field techniques in cancer of esophagus and bladder.
6. Radiotherapy technique in medulo blastoma. Whole body and hemi body radiation techniques.
7. Treatment techniques of malignant and non malignant conditions in ovarian and kidney tumours.
8. Radiation treatment techniques of lymphomas with special emphasis on mantle field irradiation radiotherapy techniques in head and neck cancer.

Salient features of computers in radiotherapy and its application.
1. Introduction to computer, Hardware and software component.
2. Input and output data systems computerized treatment planning systems in tale, brachytherapy and documentations.

Radiological protection
1. Dose limits of occupational workers & Publics.

Reference Books:
1. Mohanti, A Textbook of Radiation Oncology
2. K. Thalayan, Textbook of Radiological Safety
3. Faiz M Khan, Textbook of Radiotherapy and Treatment Planning
4. Ballinger, Textbook of Radiation Oncology

* Latest editions of all the suggested books are recommended.

III\textsuperscript{rd} YEAR
Orientations in Para Clinical Sciences

Course Contents:

UNIT-I
PARASITOLOGY
1. Entamoeba Histolytica
2. Leishmania
3. Material Parasites of man
4. Helminthology
5. Taenia Saginata
6. Taenia Soleum
7. Echinococcus granulosus
8. Ascaris Lumbricoides
9. Ancylostoma duodenale
10. Strongylids stercoralis

UNIT-II
MICROBIOLOGY
1. Morphology & Physiology of Bacteria
2. Staphylococcus
3. Streptococcus
4. Mycobacterium tuberculosis
5. Spirochetes
6. Corynbacterium Diptheria

UNIT-III
VIRUS
1. General Properties of Virus
2. Herpes virus
3. Poliovirus
4. Hepatitis virus
5. Oncogenic virus
6. HIV

UNIT-IV
PATHOLOGY
1. Inflammation
2. Neoplasia
3. Osteomyelitis
4. Fractures
5. Osteoporosis
6. Rickets
7. Osteomalacia
8. Tumours of Bone
9. Rheumatoid Arthritis
10. Gout
11. Osteoarthritis

UNIT-V
PHARMACOLOGY
1. Pharmacokinetics of Drugs
   a) Absorption
   b) Distribution
   c) Metabolism
   d) Excretion
2. Adverse drug reactions & Management
3. Pharmacology of different dyes used in Radiological procedures

Reference Books:
1. Rabbins & Cotran, Pathologic Basis & Diseases
2. Harsh Mohan, Pathologic Basis & Diseases
3. Todd & Sanford, Clinical Diagnosis by Laboratory Method
4. Ramanik Sood, Laboratory Technology Methods and Interpretation
5. Anand Narayan and Panikar, Textbook of Microbiology
6. Baweja, Medical Microbiology
7. Arora, Medical Lab Technology

* Latest editions of all the suggested books are recommended.
IIIrd YEAR
Orientation in Clinical Sciences

Course Contents:

UNIT-I
MEDICINE
1. Pericarditis
2. Valvular diseases
3. Rheumatic Heart Disease
4. Heart failure
5. Chronic Bronchitis
6. Emphysema
7. Bronchitis
8. Pneumonia
9. Tuberculosis
10. Pleura effusion
11. Empyema
12. Spontaneous Pneumo thorax

UNIT-II
1. Aclasia cardia
2. Peptic ulcer
3. Intestinal obstruction
4. Crohn’s disease
5. Ulcerative colitis
6. Pancreatitis
7. Portal Hypertension
8. Ascitis
9. Cirrhosis
10. Cholecystitis

UNIT-III
UTI
1. Glomerulo nephritis
2. Nephrotic Syndrome
3. Urinary calculi
4. Polycystic Kidney disease
5. Cerebral Vascular Disorders
6. Meningitis
7. Encephalitis
UNIT-IV
ORTHOPAEDICS
1. Fracture
2. Type Mechanism, Healing, Delayed Union, Non-complication
3. Injuries of the shoulder girdle, Dislocation of shoulder
4. Number of Humerus, Elbow Forearm
5. Number of Distal Radius & ulna
6. Injuries of the carpal
7. Dislocation of Hip
8. Femur, Tibia, Ankle, calcaneum
9. Acute & chronic osteo arthritis
10. Rhematoid arthritis
11. Paget’s Disease
12. Ankylosing spondylitis
13. Club foot
14. Bone Tumour-Benign Malignant

UNIT- V
1. Surgery
2. Cholelithiasis
3. Peritonitis
4. Suprahrenic Abscess
5. Appendicitis
6. Benign Hypertrophy prostate
7. Sinusitis

OBSTETRICS
1. Diagnosis of Pregnancy
2. Normal Labour

Reference Books:
1. Krishna Das, Textbook of Medicine
2. Kathale, Essentials of clinical medicine
3. Gopalan, Handbook of Orthopaedics
4. Shenoy, Essencial of Orthopaedics

* Latest editions of all the suggested books are recommended.
Third Year
Community Healthcare

Course Contents:
1. Definition of Health, Determinants of Health, Health Indicators of India, Health Team Concept.
   a. National Health Policy
   b. National Health Programmers (Briefly Objectives and Scope)
   c. Population of India and Family welfare programme in India.
2. Family:
   a. The family, meaning and definitions
   b. Functions of types of family
   c. Changing family patterns
   d. Influence of family on Individuals Health, family and nutrition, the effects of sickness in the family and psychosomatic disease and their Importance to physiotherapy.
3. Community:
   a. Rural community: Meaning and features – Health hazards to rural communities, health hazards to tribal community.
   b. Urban community – Meaning and features – Health hazards of urbanities
4. Culture and Health Disorders
   a. Social Change:
   b. Meaning of social changes
   c. Factors of social changes
   d. Human adaptation and social changes
   e. Social changes and stress
   f. Social changes and deviance
   g. Social changes and health programme
   h. The role of social planning in the Improvement of health and rehabilitation
5. Social Problems of disabled:
   a. Consequences of the following social problems in relation to sickness and disability

Reference Books:
1. K.Perks ,Textbook of Preventive Social Medicine
2. Sunder Lal ,Adarsh, Pandey

* Latest editions of all the suggested books are recommended.
IIIrd YEAR
Radiotherapy Planning and Quality Control (Practical)

Course Contents:

1. Treatment planning of patient
2. Deals with equipments
3. Maintenance of all radiological equipments
4. Safety of critical organs in planning methods, Role of treatment shell immobilization devices and laser in patients set up and positioning.
5. Computerized treatment planning system uses in radiation dose, time and fraction.
6. Uses of special contrast medium in radiotherapy.

Reference Books:
1. Mohanti, A Textbook of Radiation Oncology
2. K.Thalayan, Textbook of Radiological Safety
3. Faiz M Khan, Textbook of Radiotherapy and Treatment Planning

* Latest editions of all the suggested books are recommended.

IIIrd YEAR
Equipment of Radio Diagnosis (Practical)

Course Contents:

1. Application of various procedures in well equipped Hospitals and Diagnostic Centers.
2. Uses and functioning method of ultrasound probe
3. Patient evaluation on different disease and their diagnosis
4. Working method of CT scan and MRI
5. Calculation of radio nuclide isotopes

Reference Books:
1. Lele, Principle and Practice of Nuclear Medicine and Correlative Medical Imaging
2. Satish K Bhargava, CT Imaging
3. Singh Hariqbal, Atlas of Human Anatomy on CT Imaging

* Latest editions of all the suggested books are recommended.
III\textsuperscript{rd} YEAR

Interventional Radiology & Drugs Used in Diagnostic Radiology

(Practical)

Course Contents:
1. Radiography in various positions for all the special radiological procedures, using contrast media as per syllabus.
2. Positioning and treatment of various case patients by using
   a) Prescribed filters and wedges
   b) Protecting various organs
   c) Handle all patients in special and general radiography.

Reference Books:
1. Bhusan L. Lakkar, Radiological Procedure
2. Clark, Radiological Procedure

* Latest editions of all the suggested books are recommended.

III\textsuperscript{rd} YEAR

Hospital Postings

Course Contents:

Students shall be deputed to various labs of Radiology department wherein they shall undergo practical training of handling patients, collection and processing of investigation (X Ray, Special procedures, CT Scan, MRI, Ultrasound etc) and equipment.

Identification of patient’s particulars based on CR number, Lab Number and transfer of samples from collection to different labs.

Process of performing various tests in different labs

Each student is required to maintain a logbook of the various posting. Student’s performance shall be evaluated on continuous basis by the faculty posted in various sections. The faculty shall submit the assessment records of each student posted in his/her section on monthly basis to the HOD. Marks will be awarded out of 50.