Syllabus

For

Bachelor of Science in Renal Dialysis

(B.Sc.-Renal Dialysis)

Academic Programme

Duration: 3 years
Bachelor of Science in Renal Dialysis Technology [B.Sc. (RDT)]
B.Sc. Renal Dialysis (B.Sc. RD)

About the Course

Dialysis Technicians work with people whose kidneys no longer work properly or at all. These technicians, who are sometimes called hemodialysis technicians, operate machines that remove wastes, salt, and extra water from patients’ blood while keeping safe levels of certain chemicals. Dialysis patients generally use the machine for about four hours, three times a week. The technicians prepare patients for dialysis, monitor them and the machine during dialysis, and perform required procedures when dialysis is completed. Dialysis technicians help patients feel comfortable during the procedure and keep the machine in good working condition.

Bachelor of Science in Renal Dialysis Technology is an undergraduate Bioscience course. Program is designed to prepare students to administer hemodialysis treatments to patients with renal failure under the supervision of a nurse or physician. This program frequently includes in depth instruction in basic anatomy and physiology, dialysis preparation, dialysis prescription interpretation, extracorporeal circuit and dialyzer set-up and maintenance, patient preparation, equipment monitoring, venipuncture and local anaesthesia administration, taking vital signs, documentation and communication, safety and sanitation, emergency intervention, and professional standards and ethics. Subjects usually studied under this degree are Cardiac Care Technology, Respiratory Care Technology, Dialysis Technology, Imaging Sciences Technology, Clinical Medical Lab. Technology etc.

Course Advantage

The main advantage of the course is the employability factor. “These courses are practical oriented. The moment you graduate, you get a job opportunity. If it’s courses like B Sc Science, further studies is a must, and it takes lot of time for recognition. Moreover, medicine is a sector which will never decrease in demand. “Hospitals are emerging everywhere".
How is B.Sc. Renal Dialysis Technology Course Beneficial?

After passing the course they can have jobs regarding ensuring the proper functioning of dialysis machines; in some settings they perform routine equipment maintenance and repairs. The course provides knowledge pertaining to patient education, instructing patients and families about in-home dialysis treatment and reinforcing the importance of adherence to prescribed treatment. It is also beneficial for further studies such as M.Sc., M.Phil. Ph.D. etc. as students obtain good base for higher studies at this stage. They can also work in hospitals, outpatient clinics, or freestanding dialysis centers.

B.Sc. Renal Dialysis Technology Job Types

Nephrologists
Clinical Coordinator
Dialysis Technician
Dialysis Therapist
Lab Technician/ Medical Technician
Teacher Lecturer

B.Sc. Renal Dialysis Technology Suitability

Those who want to know about medical devices and equipment involved in renal replacement therapies, such as reprocessing and water treatment equipment are suitable for it. They should also be use to of patient care and equipment operation, maintenance, and repair, dialysis technologists and act to ensure regulatory compliance. Applicants willing to have specific technical knowledge and skills and an understanding of principles and concepts related to chronic kidney disease and the dialysis process also can go for it.
Teaching Pedagogy

Tell me, I forget. Show me, I remember. Involve me, I understand.

Many repetitions while students listen are ideal for the very beginning student since they need to hear the sounds of English and the voice inflections several times before they can be expected to reproduce them. We want students to enjoy their lessons and to feel unthreatened by them, because in a comfortable setting they will learn more easily. Creating "real" situation with "realia" or pictures to give all the contextual clues possible. Present important vocabulary first and then begin to introduce the conversation, keeping students' attention focused on the situation and oral language presented. Our goal in using "conversations" is for the student to be able to say each part of the conversation easily and without prompting.
Equipment

Dialysis machine
Dialysis Machine used for continuous renal replacement therapy (CRRT)
Library

The library is fully air conditioned equipped with variety of books. IEC University aims to facilitate production & dissemination of knowledge, information, insights & intellectual contribution in all areas of education. There is a library section for the Paramedical Sciences in the digitalized Central library having specialized books & journals.

Computer Labs

The highly modernized computer lab has been developed in the institute only for the students.

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  \( C = (L + T + 0.5 P) \)

• 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</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>
Points

- 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>
</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, g1, g2, g3, ………… and the corresponding weightage is (credits) are say, w1, w2, w3, ………… the SGPA is given by:

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

- 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>( \geq 9.0 )</td>
</tr>
<tr>
<td>First with Honours</td>
<td>( \geq 8.0 &lt; 9.0 )</td>
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<tr>
<td>First</td>
<td>$&gt; = 6.5 &lt; 8.0$</td>
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<td>-----------------</td>
</tr>
<tr>
<td>Second</td>
<td>$&gt; = 5.0 &lt; 6.5$</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.

**Course Structure of Three Years Bachelor of Science Degree in Renal Dialysis (B.Sc.-RD)**

The proposed curriculum has been carefully designed to meet the objectives of the IEC University. We understand that in order to cater the demands of the industry & research and to meet the challenges of the future the curriculum can be modified as and when required.

<table>
<thead>
<tr>
<th>Bachelor of Science Degree in Renal Dialysis (B.SC.-RD)</th>
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</thead>
<tbody>
<tr>
<td><strong>First Year</strong></td>
</tr>
<tr>
<td><strong>S. No.</strong></td>
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</tbody>
</table>
25
<table>
<thead>
<tr>
<th>S. No.</th>
<th>Sub Code</th>
<th>Subject</th>
<th>Contact Hours</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>RD-201</td>
<td>Applied anatomy &amp; Physiology related to dialysis technology</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>RD-202</td>
<td>Applied Pathology &amp; Microbiology related to dialysis technology</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>3.</td>
<td>RD-203</td>
<td>Pharmacology related to dialysis technology</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>RD-204</td>
<td>Concepts of renal disease, dialysis &amp; nutrition</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>5.</td>
<td>RD-205</td>
<td>Sociology</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>6.</td>
<td>RD-206</td>
<td>Constitution of India</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>7.</td>
<td>RD-207</td>
<td>Health Care</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>
### Third Year

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Sub Code</th>
<th>Subject</th>
<th>Contact Hours</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>RD-301</td>
<td>Applied dialysis technology - Paper I</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>RD-302</td>
<td>Applied dialysis technology - Paper II</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>3.</td>
<td>RD-303</td>
<td>Applied dialysis technology - Paper III</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>4.</td>
<td>RD-351</td>
<td>Applied dialysis technology - Paper I</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>5.</td>
<td>RD-352</td>
<td>Applied dialysis technology - Paper II</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>6.</td>
<td>RD-353</td>
<td>Applied dialysis technology - Paper III</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

**Total** | **24** | **18**

**Total credits of the Whole Course** = 70 Credits
SYLLABUS

MAIN SUBJECTS

First Year

No. of Theory classes: 70 hours

No. of Practical classes: 20 hours

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
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.


7. Points of palpation of nerves and arteries.
PHYSIOLOGY
Subject Code: BPT-102
Minimum Hours: Theory-140 Hrs., Practical-60 Hrs.
THEORY

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

2. Blood:
Introduction-composition & function of blood
W.B.C., R.B.C., Platelets formation & functions, Immunity
Groups- types, significance, determination Hemoglobin
Haemostasis
Lymph-composition, formation, circulation &functions

3. Cardiovascular system:

<table>
<thead>
<tr>
<th>7. Renal System:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conducting system-components, impulse conduction</td>
</tr>
<tr>
<td>Physiology of kidney and urine formation</td>
</tr>
<tr>
<td>Glomerular filtration rate, clearance, Tubular function</td>
</tr>
<tr>
<td>Heart valves</td>
</tr>
<tr>
<td>Cardiac cycle-definition, phases</td>
</tr>
<tr>
<td>Cardiac output- definition, normal value, determinants. Stroke volume and its regulation</td>
</tr>
<tr>
<td>Heart rate and its regulation:</td>
</tr>
<tr>
<td>Arterial pulse, Blood pressure-definition, normal values, factors affecting blood pressure</td>
</tr>
<tr>
<td>Shock-definition, classification, causes and features Basic idea of ECG</td>
</tr>
<tr>
<td>Cardiovascular changes during exercise</td>
</tr>
</tbody>
</table>

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

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.

BIOCHEMISTRY

No. Theory classes: 70 hours
No. of Practical classes: 20 hours

Theory:

1. Specimen collection:

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, Erle Meyer conical etc). Funnels: different types (conical, Buchner etc). Bottles: reagent bottles – graduated and common, wash bottles – different type specimen bottles

3. Measuring cylinders, porcelain dish
   Use of glass: significance of boro silicate glass, care and cleaning of glass ware, different cleaning solutions of glass. Care and cleaning of plastic ware, different cleaning solution.

4. Instruments (Theory and demonstration) Diagrams to be drawn
   Use, care and maintenance of: water bath, oven & incubators, water distillation plant,
water de ionisers, refrigerators, cold box, deep freezers, reflux condenser, centrifuge, balances, colorimeter, spectrophotometer, pH meter and electrodes. Centrifuges: definition, principles, Svedberg unit, centrifugal force, centrifugal field, RPM, conversion of G to RPM and vice versa, different types of centrifuges. Manual balances: single pan, double pan, triple balance, direct read out electrical balances. Guideline to be followed and precautions to be taken while weighing. Weighing different types of chemicals, liquids, hygroscopic compounds etc. Colorimeter, spectrophotometer, pH meter, electrodes, salt bridge solution: principles, parts, types, guidelines to be followed and precautions to be taken while using.

5. **Safety of measurements**

6. **Conventional and SI unit**

7. **Atomic structure**
   Dalton’s theory, properties of electrons, protons, neutrons, and nucleus, Rutherford’s model of atomic structure, Bohr’s model of atomic structure, orbit and orbital quantum numbers, Heisenberg’s uncertainty principle. Electronic configuration, Aufbau principle, Pauli’s exclusion principle, etc.
   Valency and bonds: different types of strong and weak bonds in detail with examples.
   Theory & Practicals for all the following under this section: molecular weight, equivalent weight of elements and compounds, normality, molarity. Preparation of molar solutions (mole/litre solution) eg: 1 M NaCl, 0.15 M NaCl, 1 M NaOH, 0.1 M HCl, 0.1 M H₂SO₄ etc. Preparation of normal solutions. eg, 1N Na₂CO₃, 0.1N Oxalic acid, 0.1 N 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.

8. **Dilutions**
   Diluting solutions: e.g. preparation of 0.1 N NaCl from 1 N NaCl & from 2N NaCl 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. Technique for preparation of standard solutions eg: glucose, urea, etc, significance of volumetric flask in preparing standard solutions. Volumetric flasks of different sizes, preparation of standard solutions of deliquescent compounds
(CaCl$_2$, potassium carbonate, sodium hydroxide etc). Preparation of standards using conventional and SI units acids, bases, salts and indicators.

9. **Acids and Bases**
   Preparation of buffer solutions using pHmeter. Salts: definition, classification, water of crystallization, definition and different types, deliquescent and hygroscopic salts.

10. **Acid-base indicators: (Theory and Practicals)**
    **Theory**
    Definition, concept, mechanism of dissociation of an indicator, colour change of an indicator in acidic and basic conditions, use of 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.
    **Practicals**
    Titration of a simple acid and a base (preparation of standard solution of oxalic acid and using this solution finding out the normality of a sodium hydroxide solution. Acid to be titrated using this base Calculation of normality of an acid or a base after titration, measurement of hydrogen ion concentration.

11. **Quality control**

12. **Special Investigations**
    Serum electrophoresis, immunoglobulins, drugs: digitoxin, theophyllines, regulation of acid base status, Henderson Hasselbach equations, buffers of the fluid, pH regulation, disturbance in acid base balance, anion gap, metabolic acidosis, metabolic alkalosis, respiratory acidosis, respiratory alkalosis, basic principles and estimation of blood gases and pH, basic principles and estimation of electrolytes, water balance, sodium regulation,
bicarbonate buffers, nutrition, nutritional support with special emphasis on parental nutrition, calorific value, nitrogen balance, respiratory quotient, basal metabolic rate, dietary fibers, nutritional importance of lipids, carbohydrates and proteins, vitamins.

PRACTICALS

Analysis of normal urine.
Composition of urine.
Procedure for routine screening.
Urinary screening for inborn errors of metabolism.
Common renal disease.
Urinary calculus.
Urine examination for detection of abnormal constituents.
Interpretation and diagnosis through charts.
Liver function tests.
Lipid profile.
Renal function test.
Cardiac markers.
Blood gas and electrolytes.
Estimation of blood sugar, blood urea and electrolytes.
Demonstration of strips, demonstration of glucometer.

REFERENCE BOOKS

1. Varley: Clinical chemistry
2. Teitz: Clinical chemistry
3. Kaplan: Clinical chemistry
8. Rajagopal: Practical Biochemistry for Medical students-, Orient Longman PVT Ltd.
PATHOLOGY & MICROBIOLOGY

No. Theory classes: 70 hours
No. of Practical classes: 20 hours

Theory

1. Histopathology

2. Clinical Pathology
   Introduction to clinical pathology. Collection, transport, preservation, and processing of various clinical specimens. Urine Examination: collection and preservation of urine, physical, chemical, microscopic examination. Examination of body fluids. Examination of cerebro spinal fluid (CSF). Sputum examination. Examination of faeces.

3. Haematology

4. Blood Bank

PRACTICALS
REFERENCE BOOKS

1. Culling: Histopathology techniques
2. Bancroft: Histopathology techniques
3. Koss: Cytology
4. Winifred Greg: Diagnostic Cytopathology
5. Orell: Cyto Pathology
6. Todd & Sanford: Clinical Diagnosis by laboratory method
7. Dacie & Lewis: Practical Haematology

MICROBIOLOGY

Theory

1. Morphology
Classification of microorganisms, size, shape and structure of bacteria. Use of microscope in the study of bacteria. 4 hours

2. Growth and nutrition
Nutrition, growth and multiplications of bacteria, use of culture media in diagnostic bacteriology. 3 hours

3. Culture media
Use of culture media in diagnostic bacteriology, anti microbial sensitivity test. 1 hour

4. Sterilisation and Disinfection
Principles and use of equipments of sterilization namely hot air oven, autoclave and serum inspissator, pasteurization, antiseptic and disinfectants. 4 hours

5. Immunology
Immunity, vaccines, types of vaccine and immunization schedule, principles and
interpretation of common serological tests namely Widal, VDRL, ASLO, CRP, RF & ELISA. Rapid tests for HIV and HBsAg (excluding technical details).  

6. Systematic Bacteriology  
Morphology, cultivation, diseases caused, laboratory diagnosis including specimen collection of the following bacteria (excluding classification, antigenic structure and pathogenicity), Staphylococci, Streptococci, Pneumococci, Gonococci, Meningococci, C. diphtheriae, Mycobacteria, Clostridia, Bacillus, Shigella, Salmonella, Esch coli, Klebsiella, Proteus, Vibrio cholerae, Pseudomonas & Spirochetes.  

7. Parasitology  
Morphology, life cycle, laboratory diagnosis of following parasites: E. histolytica, Plasmodium, tape worms, Intestinal nematodes.  

8. Mycology  
Morphology, diseases caused and lab diagnosis of following fungi. Candida, Cryptococcus, Dermatophytes, opportunistic fungi  

9. Virology  
General properties of viruses, diseases caused lab diagnosis and prevention of following viruses, Herpes, Hepatitis, HIV, Rabies and Poliomyelitis.  

10. Hospital infection  
Causative agents, transmission methods, investigation, prevention and control of hospital infection.  

11. Principles and practice Biomedical waste management  

Practical  
Compound microscope.  
Demonstration of sterilization equipments: hot air oven, autoclave, bacterial filters.
Demonstration of commonly used culture media, nutrient broth, nutrient agar, blood agar, chocolate agar, Mac conkey medium, L J media, Robertson cooked meat media, Potassium tellurite media with growth, Mac with LF & NLF, NA with staph. Antibiotic susceptibility test.

Demonstration of common serological tests: Widal, VDRL, ELISA. Grams staining. Acid fast staining. Stool exam for helminthic ova & cysts.

Visit to hospital for demonstration of biomedical waste management. Anaerobic culture methods.

**REFERENCE BOOKS**


2. Robert Cruickshank: Medical Microbiology – The Practice of Medical Microbiology.

3. Chatterjee: Parasitology – Interpretation to Clinical medicine.


5. Emmons: Medical Mycology.


**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.
FOUNDATION ENGLISH

Teaching Hours: 20

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:

Ethics

Subject Code: BPT-106
1. **Introduction**
   Medical ethics introduction, Ethical principles in health care, Scope of practice, enforcing standards in health profession- promoting quality care, Professional Ethics in research, education and patient care delivery, Informed consent issues, Medical ethics and Economics in clinical decision making.

2. **Objectives**
   Identify underlying ethical issues and problems in medical practice

3. a. **Perspective of medical ethics**

   b. **Ethics of Individual**
   Truth and confidentiality, the concept of disease, health and healing, the right to health

   c. **The ethics of human life**
   Prenatal sex determination

   d. **The family and society in medical ethics**

   e. **Death and dying**
   Use of life-support systems, the right to die with dignity, suicide-the ethical outlook

   f. **Professional Ethics**
   Contract and confidentiality

4. Rules of professional conduct: Relationships with patients, colleagues, peers, medical and other professional and health care institutions.

5. Confidentiality and Responsibility, Malpractice and Negligence, Provision of services and advertising, legal aspects: Consumer protection act, Legal responsibility of the individual for their action in professional context and understanding liability and obligations in case of medico-legal action.
MAIN SUBJECTS

Second Year B.Sc. Renal Dialysis Technology

Paper 1

Applied Anatomy & Physiology Related To Dialysis Technology

Applied anatomy

2. Histology of kidney.
5. Anatomy of peritoneum including concept of abdominal hernias.
6. Anatomy of vasculat system:
   a) Upper limb vessels: course, distribution, branches, origin & abnormalities.
   b) Neck vessels: course, distribution, branches, origin & abnormalities.
   c) Femoral vessels: course, distribution, branches, origin & abnormalities.

Physiology

1. Mechanism of urine formation.
2. Glomerular filtration rate (GFR).
3. Clearance studies.
4. Physiological values of urea, creatinine, electrolytes, calcium, phosphorous, uric acid, magnesium, glucose; 24 hours urinary indices – urea, creatinine, electrolytes, calcium, magnesium.
5. Physiology of renal circulation
   a) Factors contributing & modifying renal circulation.
   b) Autoregulation.
7. Haemostasis: coagulation cascade, coagulation factors, auto regulation, BT, CT, PT, PTT, thrombin time.
8. Acid base balance: basic principles & common abnormalities like hypokalemia, hyponatremia, hyperkalemia, hyponatremia, hypocalcemia, hypercalcemia, pH, etc.
9. Basic nutrition in renal diseases.

Paper 2

Applied Aspects of Pathology & Microbiology

Pathology

1. Congenital abnormalities of urinary system.
2. Classification of renal diseases.
5. Renal vascular disorders.
7. Pathology of kidney in hypertension, diabetes mellitus, pregnancy.
8. Pathology of peritoneum, peritonitis, bacterial, tubular & sclerosing peritonitis, dialysis induced changes.
9. Pathology of urinary tract infections
10. Pyelonephritis & tuberculous pyelonephritis

Microbiology

2. Human immunodeficiency virus (HIV), mode of transfusion, universal precautions.
3. Opportunistic infections.
5. Microbiology of vascular access infection (femoral, jugula, subclavian catheters).

Paper 3

Pharmacology Related to Dialysis Technology

1. IV fluid therapy with special emphasis in renal diseases.
2. Diuretics: classification, actions, dosage, side effects & contraindications.
3. Anti hypertensives: classification, actions, dosage, side effects & contraindications, special reference during dialysis, vasopressors, drugs used in hypotension.
4. Drugs & dialysis: dose & duration of administration of drugs.
5. Dialysable drugs: phenobarbitone, lithium, methanol etc.
6. Vitamin D & its analogues, phosphate binders, iron, folic acid & other vitamins of therapeutic value.
7. Erythropoietin in detail.
8. Heparin including low molecular weight heparin.
10. Formalin, sodium hypochlorite, hydrogen peroxide: role as disinfectants & adverse effects of residual particles applicable to formalin.
13. Potassium exchange resins with special emphasis on mode of administration.
Paper 4

Basic Concepts of Renal disease, dialysis and nutrition

Basic Concepts of Renal Diseases
1. Acute renal failure.
3. Nephritic syndrome.
4. UTI (urinary tract infections.)
5. Asymptomatic urinary abnormalities.
6. Chronic renal failure.
7. Renal stone diseases.
8. Obstructive uropathies.
10. Tumors of kidney.
12. Renal vascular disorders & hypertension associated renal diseases.

Basic Concepts of Dialysis Technology
13. Definition.
15. Types of dialysis.
17. Haemodialysis apparatus - types of dialyser & membranes.
18. Types of vascular access for haemodialysis.
19. Introduction to haemodialysis machine.
20. Priming of dialysis apparatus.
21. Dialyser reuse.
23. Monitoring of patients during dialysis.

Basic Concepts of Nutrition
1. Introduction to science of nutrition.
   a. Definition.
   b. Food pattern and its relation to health.
   c. Factors influencing food habits.
   d. Superstitions, culture, religion, income, composition of family, age, occupation, special group etc.
   e. Food selection, storage and preservation.
   f. Prevention of food adulteration.
2. Classification of nutrients.
   a. Macronutrients and micronutrients.
   b. Types, sources, requirements and deficiency of proteins.
   c. Sources, requirements and deficiency of carbohydrates.
   d. Types, sources, requirements and deficiency of fats.
   e. Sources, requirement and storage of drinking water.
f. Types, sources, requirements and deficiency of minerals.
g. Types, sources, requirements and deficiency of vitamins.

3. Planning of diets.
   a. Need for planning of diets.
   b. Concepts of balanced diet.
   c. Food groups and balanced diet.
   d. Influence of age, sex, occupation & physiological state.
   e. Recommended dietary intake.
   f. Steps in planning balanced diet.
   g. Concepts of balanced diet for dialysis patients.
   h. Recommended dietary intake for dialysis patients.
   i. Planning diet for dialysis patients.
   j. Steps in planning balanced diet for dialysis patients.

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SUBSIDIARY SUBJECTS
Second Year B.Sc. Renal Dialysis Technology

SOCIOLOGY

Teaching Hours: 20

1. Course description
This course will introduce student to the basic concepts of sociology, principles, social processes and social institutions in relation to the individual, family and community. The various social factors affecting the family in rural and urban communities in India will be studied.

2. Introduction
   a. Meaning, definition and scope of sociology.
   b. Its relation to anthropology, psychology, social psychology.
   c. Methods of sociological investigations: case study, social survey, questionnaire, interview and opinion poll methods.
   d. Importance of its study with special reference to health care professionals.

3. Social factors in health and disease
   a. Meaning of social factors.
   b. Role of social factors in health and disease.

4. Socialization
   a. Meaning and nature of socialization.
   b. Primary, secondary and anticipatory socialization.
   c. Agencies of socialization.
5. **Social groups**  
   a. Concepts of social groups, influence of formal and informal groups on health and sickness.  
   b. The role of primary groups and secondary groups in the hospital and rehabilitation setup.

6. **Family**  
   a. The family, meaning and definitions.  
   b. Functions of types of family.  
   c. Changing family patterns.  
   d. Influence of family on individual’s health, family and nutrition.  
   e. The effects of sickness in the family  
   f. Psychosomatic diseases and their importance.

7. **Community**  
   a. Rural community: meaning and features.  
   b. Health hazards of rural communities.  
   c. Health hazards of tribal communities.  
   d. Urban community: meaning and features.  
   e. Health hazards of urban communities.

8. **Culture and health**  
   a) Concept of culture.  
   b) Concept of health.  
   c) Culture and health.  
   d) Culture and health disorders.

9. **Social change**  
   a) Meaning of social changes.  
   b) Factors of social changes.  
   c) Human adaptation and social change.  
   d) Social change and stress.  
   e) Social change and deviance.  
   f) Social change and health programme.  
   g) The role of social planning in the improvement of health and rehabilitation.

10. **Social problems of disabled**  
   (Consequences of the following social problems in relation to sickness and disability and remedies to prevent these problems):  
   a) Population explosion.  
   b) Poverty and unemployment.  
   c) Beggary.  
   d) Juvenile delinquency.  
   e) Prostitution.  
   f) Alcoholism.  
   g) Problems of women in employment.
11. Social security  
   a) Social Security and social legislation in relation to the disabled.

12. Social work  
   a) Meaning of social work.  
   b) The role of a medical social worker.

REFERENCE BOOKS


CONSTITUTION OF INDIA


2. **Unit – II**: The democratic institutions created by the constitution, Bicameral system of Legislature at the Centre and in the States.

3. **Unit – III**: Fundamental rights and duties their content and significance.

4. **Unit – IV**: Directive principles of States, policies the need to balance fundamental rights with directive principles.

5. **Unit – V**: Special rights created in the Constitution for dalits, backwards, women and children and the religious and linguistic minorities.

6. **Unit – VI**: Doctrine of Separation of Powers, legislative, executive and judicial and their functioning in India.

7. **Unit – VII**: The Election Commission and State Public Service commissions.

8. **Unit – VIII**: Method of amending the Constitution.

9. **Unit – IX**: Enforcing rights through writs.

10. **Unit – X**: Constitution and sustainable development in India.
RECOMMENDED BOOKS:


HEALTH CARE

Teaching Hours : 40

1. Introduction to Health

   a) Definition of health, determinants of health, health indicators of India, health team concept.
   b) National health policy
   c) National health programmes (Briefly objectives and scope)
   d) Population of India and family welfare programme in India

2. Introduction to Nursing

   a) What is nursing? Nursing principles, inter-personnel relationships.
   b) Bandaging: basic turns, bandaging extremities, triangular bandages and their application.
   c) Nursing position, prone, lateral, dorsal, dorsal recumbent, Fowler's positions, comfort measures, bed making, rest and sleep.
   d) Lifting and transporting patients: lifting patients up in the bed, transferring from bed to wheelchair, transferring from bed to stretcher.
   e) Bed side management: giving and taking bed pan, urinal.
   f) Observation of stools, urine, sputum
   g) Use and care of catheters, enema giving.
   h) Methods of giving nourishment: feeding, tube feeding, drips, transfusion.
   i) Care of rubber goods.
   j) Recording of body temperature, respiration and pulse.
   k) Simple aseptic techniques, sterilization and disinfection.
   l) Surgical dressing: observation of dressing procedures.

3. First Aid :
   Syllabus as for Certificate Course of Red Cross Society of St. John's Ambulance Brigade.

REFERENCE BOOKS:

1. Preventive and Social Medicine by J.Park
1. Setting up of automated peritoneal dialysis equipment.
2. First assistant in minor procedures.
3. Skin suturing.
4. CPR demonstrations.

MAIN SUBJECTS

Third Year B.Sc. Renal Dialysis Technology

Paper 1

Applied Dialysis Technology-1

1. Indications of dialysis.
2. History & types of dialysis.
5. Physiology of peritoneal dialysis.
6. Dialysis machines: mechanism of functioning & management:
   a) Haemodialysis machine.
   b) Peritoneal dialysis machine.
8. Adequacy of dialysis:
   a) Haemodialysis.
   b) Peritoneal dialysis.
   c) Peritoneal equilibration test (PET).
9. Anti coagulation.
10. Withdrawal of dialysis criteria:
    a) Acute dialysis.
    b) Chronic dialysis.
11. Dialyser reuse.
12. Water treatment system.
Paper 2

Applied dialysis technology -2

1. Dialysis in special situations:
   a) Patients with congestive cardiac failure.
   b) Advanced liver disease.
   c) Patients positive for HIV, HB$_S$Ag & HCV.
   d) Failed transplant.
   e) Poisoning cases.
   f) Pregnancy.


3. Special dialysis procedures:
   a) Continuous therapies in haemodialysis.
   b) Different modalities of peritoneal dialysis.
   c) Haemodiafiltration.
   d) Haemoperfusion.
   e) SLED.
   f) MARS.

4. Plasmapheresis:

5. Special problems in dialysis patients:
   a) Psychology & rehabilitation.
   b) Diabetes.
   c) Hypertension.
   d) Infections.
   e) Bone diseases.
   f) Aluminium toxicity.


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Paper 3

Applied dialysis technology -3

1. Vascular access for haemodialysis & associated complications.

2. Peritoneal access devices: types of catheter, insertion techniques & associated complications.

3. Complications of dialysis:
   a) Haemodialysis: acute & long term complications.
   b) Peritoneal dialysis: mechanical & metabolic complications.
4. Peritonitis & exit site infection.
5. Recent advances in haemodialysis.
   a) Nocturnal dialysis.
   b) Online dialysis.
   c) Daily dialysis.
6. Telemedicine in dialysis practice.

**Third year B.Sc. Renal Dialysis Technology**

**Practical schedule**

5. Setting up dialysis machine for dialysis.
6. A V cannulation.
7. A V fistula/A V graft cannulation.
8. Initiation of dialysis through central venous catheters like internal jugular, femoral & subclavian vein.
10. Closing of dialysis.
11. Preparation of concentrates depending on the situations.
12. Reuse of dialysis apparatus.
13. Isolated ultrafiltration.