THE APOLLO UNIVERSITY

DIVISION OF ALLIED HEALTH SCIENCES

SCHOOL OF HEALTH SCIENCES

COURSE STRUCTURE & SYLLABI
(B.Sc. Renal Dialysis Technology)

FOR 2023, 2024 & 2025 ADMITTED BATCH

The Apollo University

A DIVISION OF AHERF

INDEX

PROGRAM OUTCOMES (PO)

PO 1: Clinical care: Organize and implement the prescribed preventive, investigative and management plans; and will offer care and appropriate follow-up services to patients in a cost-effective way.

PO 2: Communication: Communicate effectively and appropriately with patients/clients, caregivers, other health professionals and other members of the community.

PO 3: Membership of a multidisciplinary health team: Function effectively as an individual, and as a member in multidisciplinary healthcare teams to accomplish shared goals within and across settings to achieve coordinated, high-quality care.

PO 4: Ethics and accountability at all levels: Understand the core concept of clinical ethics and law so that they may apply these to their practice as healthcare service providers.

PO 5: Commitment to professional excellence: Execute professionalism and reflect technical competence, appearance, empathy, compassion, honor, and integrity in his/her thought and action to ensure the safe delivery of healthcare.

PO 6: Leadership and mentorship: Demonstrate leadership qualities where needed in order to ensure clinical productivity and patient satisfaction in an autonomous and confident manner.

PO 7: Social accountability and responsibility: Recognize that allied health professionals need to judiciously manage resources and promote innovation and sustainability to provide optimal patient care in a socially responsible manner.

PO 8: Scientific attitude and scholarship: To be engaged in evidence-based practice and need-based research studies and to apply and disseminate research findings and knowledge for improving the quality of care.

PO 9: Lifelong learning: Recognize the need and have the ability to engage in independent and continuous lifelong learning and improvement in skills and knowledge while harnessing modern tools and technology for the advancement of self and profession.

PROGRAM SPECIFIC OUTCOMES (PSO):

PSO 1: Understand and apply the principles of dialysis and the skills necessary to give safe and effective care to the individual undergoing hemodialysis treatments.

PSO 2: Demonstrate the use of hemodialysis equipment with an understanding of the process of operating dialysis equipment and alternate dialysis procedure.

PSO 3: Assess the patient for any complications with an understanding of the problem and recognize the need to report complications to the physician or nephrologist

PROGRAM EDUCATIONAL OBJECTIVES (PEO):

PEO1: Demonstrate technical proficiency, in-depth knowledge, and application of scientific and safety principles in all allied health professional programs and apply clinical skills to one's own work, as a member and leader in a team, and in multidisciplinary clinical settings and to attain high level of proficiency in defined clinical competencies of the allied health technologists

PEO2: Recognize that allied and healthcare professionals need to be advocates within the healthcare system, to judiciously manage resources and to acknowledge their social accountability. To serve the community, region and the nation and will hence direct all research and service activities towards addressing their priority health concerns. Have the ability to engage in independent and lifelong learning and improvement in skills and knowledge while harnessing modern tools and technology.

PEO3: Practice with ethics and accountability at all levels (clinical, professional, personal, and social). To exhibit at all times a high level of professionalism and this be reflected in his/her thought and action, as well as in a range of attributes and characteristics that include technical competence, empathy, verbal and non-verbal communication, an anti-discriminatory and non-judgmental attitude. Communicate effectively and appropriately with patients/clients, caregivers, and health professionals.

PEO4: Inculcate the skills to function effectively as an individual and as an active member of a multidisciplinary health team. Develop skills to take on a leadership role in order to ensure clinical productivity and patient satisfaction. Must be able to respond in an autonomous and confident manner to planned and uncertain situations and should be able to manage themselves and others effectively.

THE APOLLO UNIVERSITY
ACADEMIC REGULATIONS

SCOPE:

This Academic regulation provide a framework for the regulatory guidelines of all programs offered by The Apollo University. It includes procedures and practices that are to be followed to ensure academic standards in the University. The regulations are approved by the Academic Council. These regulations may be amended from time to time with the approval of the Academic council for the benefit of students or sometimes to reflect the changes suggested by the statutory bodies.

Information regarding amendments (if any) to the regulations will be communicated to the students by publishing in the University website. Students must follow the amended regulations as they might impact the process for the award of degree. The decision of the Vice Chancellor shall be the final in case of any discrepancy. These regulations apply to all students, despite the program of study.

1. ADMISSION INTO THE PROGRAM

The University admits the students in two modes. One through the convenor quota as per the Andhra Pradesh Private Universities Act, for which the admissions will be carried out through the convener quota by the Govt of Andhra Pradesh. The other is through University quota for which the following procedure will be followed:

A. The applicant shall satisfy the entrance requirements specified by The Apollo University and in accordance with guidelines of statutory councils for various Under-graduation /Post-graduation /Doctor of Philosophy programs.
B. The Applicant shall be qualified in the qualifying examination for a particular program.
C. The Applicant secures a rank in national level entrance exam, or suitable such test conducted by The Apollo University / professional body.
D. The Applicant qualifies in the specified state or national level examinations prescribed by The Apollo University.

The Apollo University will widely notify the counselling schedule for admissions into the academic programs in the media. The provisional admission will be given to the eligible students during the counseling scheduled by The Apollo University. The selected candidates will be provisionally admitted into the program of his/her choice if the candidate meets the program specific requirements in addition to academic performance qualifying exam. Admission is purely based on merit and so merely meeting the requirements will not ensure admission. The University does not discriminate based on gender, race, region, religion, disability or nationality. The University reserves the right to make admissions based on various criteria which is specified in the admission brochure.

2. ELIGIBILITY CRITERIA

Undergraduate programs

The qualifying exam eligibility for each program is given Annexure 1. The student should have passed the qualifying exam either in the year the student is seeking admission or the previous year.

Convener Quota: The student seeking admission to any program under convener quota shall qualify in the relevant entrance exam conducted by the Government of Andhra Pradesh.

University Quota: For getting admission under University quota, percentage of marks obtained in the qualifying exam, the rank obtained in TAU entrance exam or any recognized national level examination in the year of admission will be considered.

Counselling

All the eligible students need to apply for admission and have to attend counselling conducted by TAU as per the schedule for the university quota.

3. PROGRAMS

The Apollo University offers variety of programs which includes certificate, undergraduate, postgraduate, and Research. The list of programs on offer for the academic year 2023-24 are annexed in Annexure 3

Minimum duration of the program

The minimum duration of each program depends on the type of program, viz., undergraduate, postgraduate, integrated programs, etc., and the faculty which offers the program. The maximum duration of the program is N+2 years, where N stands for the minimum duration of the program as mentioned in Annexure 3. If the student has not obtained the minimum number of credits within the stipulated time, the Vice-Chancellor may extend the maximum duration in extenuating circumstances upon receiving a request along with reasons from the student for not completing the program on time.

4. CHOICE BASED CREDIT SYSTEM

The choice-based credit system (CBCS) facilitates the education student-centric. It provides the opportunity for the learner to choose the courses from a basket of core, elective, and skill enhanced courses. All programs of study are designed to meet the specified number of credit requirements. The courses taken by the student in each semester as part of program are allotted some credit points based on the number of hours assigned. Upon successful completion of the course, the student secures the number of credits allotted for that course. Once the minimum number of credits of the program is achieved, the degree can be awarded, subject to fulfillment of all other relevant conditions.

5. STRUCTURE OF THE PROGRAM

The Program structure Consists of

i) University Courses
   A. University Core
   B. University Electives

ii) Faculty Courses
   A. Faculty Core
   B. Faculty Electives
iii) Program Courses
   A. Program Core
   B. Program electives

Each course* is assigned a certain number of credits depending upon the number of contact hours (lectures/tutorials/practical) per week. (*one course means one subject)

Core Courses = 4 Credits Elective =3 Credits

In general, credits are assigned to the courses as detailed below:

- A classroom lecture/ tutorial of 60 min (1 hr) duration per week, spread over the entire semester, shall be considered as one credit.
- A laboratory session of a minimum of 120 min (2 hr) per week shall be considered as one credit.
- A project work/ Internship session of 60 minutes (1 hr) carried out per week shall be considered as one credit.

6. MEDIUM OF INSTRUCTION

The medium of instruction (including examinations and project reports) shall be English.

7. REGISTRATION

Any of the following student must register for the courses opted in a particular semester during the scheduled registration period.

i. a new student who enrolls into any program
ii. an existing student who is continuing on rolls from the preceding regular semester
iii. a former student, i.e., who has not enrolled in the preceding regular semester or who has availed academic break or detained and got readmission

Each newly admitted student shall attend an induction/ orientation program prior to commencement of the first semester. During this program academic advisors assist the students in choosing the courses. Existing students may register online by using their registration number and mail ID through the Apollo ERP portal. Class schedules are available approximately two weeks before the beginning of every semester for each program. The concerned head of the department must approve class schedule.

8. ATTENDANCE REQUIREMENTS

- Students should earn a minimum of 80% attendance in the current semester to become eligible to write the Semester End examinations.
- The monthly statement of attendance will be displayed on the Department Notice Board/ Apollo ERP by the respective departments within the first five working days of the following month.
- Candidates who are falling short of 80% attendance will be detained on the recommendation of the HoD and are not eligible to appear for the current semester

examinations. The students who are detained in the current semester will not be allowed to register for the next semester and they have to repeat the same semester by paying the tuition fee prescribed. However, they can write arrear subjects, if any.

9. EVALUATION

The assessment of the student's performance in a Theory course shall be based on two components: Continuous Evaluation (40 marks) and Semester-end examination (60 marks). A student has to secure an aggregate of 40% in the course in the two components put together to be declared to have passed the course, subject to the condition that the candidate must have secured a minimum of 24 marks (i.e. 40%) in the theory component at the semester-end examination. Practical/ Project Work/ Industrial Training/ Viva voce/ Seminar etc. are completely assessed under Continuous Evaluation for a maximum of 100 marks, and a student has to obtain a minimum of 50% to secure Pass Grade. For courses having both theory and practical components, 60% of the weightage will be given for theory component and 40% weightage for practical component. The student must secure 40% (Theory + Practical) with 24 marks minimum in theory to attain pass grade.

Details of Assessment Procedure are furnished below in Table 1.

Table 1: Assessment Procedure

S. No.	Component of Assessment	Marks Allotted	Type of Assessment	Scheme of Evaluation
1	Theory	40 60	Continuous Evaluation Semester-end Examination	i) Twenty (20) marks for mid examinations. Three mid examinations shall be conducted for 20 marks each; an average of the best two performances shall be taken into consideration. ii) Ten (10) marks for Quizzes, Assignments and Presentations. iii) Ten (10) marks for periodic evaluation ,case studies and projects iv) Sixty (60) marks for Semester-end examinations
	Total	100		

2	Laboratory	100	Continuous Evaluation	1)80 marks with equal weightage to all experiments subject to conduct of minimum of 10 experiments 2)20marks for the end exam (with one of our university teacher as external other than course teacher)
3	Project work	100	Continuous Evaluation	i) (80) marks for periodic evaluation and technical report writing by the Project Supervisor. ii) Twenty (20)marks for final Report presentation and Viva-voce, by a panel of internal examiners
4	Students Seminars	100	Continuous Evaluation	Each student has to give a seminar on any topic in consultation with the faculty member in charge. A detailed report shall be submitted to the in charge . 60 marks for periodic evaluation including report preparation and 40 marks for viva voce by a panel of examiners.

10. GRADING SYSTEM

Based on the student performance during a given semester, a final letter grade will be awarded at the end of the semester in each course. The letter grades and the corresponding grade points are as given inTable2.

Table 2: Grades & Grade Points

Sl. No.	Grade	Grade Points	Absolute Marks
1	O(Outstanding)	10	90andabove
2	A+(Excellent)	9	80 to 89
3	A(Very Good)	8	70 to 79
4	B+(Good)	7	60 to 69
5	B(Above Average)	6	50 to 59
6	C(Average)	5	45 to 49
7	P(Pass)	4	40 to 44
8	F(Fail)	0	Lessthan40
9	Ab.(Absent)	0	-

SEMESTER GRADEPOINTAVERAGE (SGPA)

A Semester Grade Point Average (SGPA) for the semester will be calculated according to the formula:

$$SGPA = \frac{\sum[\ C \times G\ ]}{\sum C}$$

Were

C=number of credits for the course,

G=grade points obtained by the student in the course.

A student who earns a minimum of 4 grade points (P grade) in a course is declared to have successfully completed the course and is deemed to have earned the credits assigned to that course.

CUMULATIVE GRADE POINT AVEARGE (CGPA)

A similar formula is used to arrive at Cumulative Grade Point Average (CGPA), considering the student's performance in all the courses taken in all the semesters up to the particular point of time.

Table 3 shows the CGPA required for the award of class after the successful completion of the program.

Table3:CGPA required for award of Class

Class	CGPA Required
First Class with Distinction	≥8.0*
First Class	≥6.5
Second Class	≥5.5
Pass Class	≥5.0

*In addition to the required CGPA of 8.0 or more, the student must have necessarily passed all the courses of every semester in first attempt.

11. REAPPEARANCE

a. A student who has secured 'F' grade in a Theory course shall have to reappear at the subsequent Semester end examination held for that course.
b. A student who has secured 'F' grade in a Practical course shall have to attend Special Instruction Classes scheduled by the Department for securing pass.
c. A student who has secured 'F' Grade in Project work / Industrial Training etc shall have to reappear for Viva – voce scheduled by the department.
d. A student who is declared fail (F) in a course/s can apply for revaluation within one week from the date of publication of results with a fee prescribed by the university. The marks /grade awarded in the revaluation is final.

11.1 Procedure for revaluation

- The students who have not satisfied with the marks awarded by the examiner can apply for revaluation of his/her answer script/s
- The students have to apply through proper channel for revaluation and to pay the revaluation fee per paper to the university towards revaluation fee.
- Students have to apply for revaluation within 7 days from the date publication of result.

The scripts will get valued by second examiner and if the difference is more than 15 marks, they will get valued by the third examiner. The average of the nearest two marks will be declared as the final marks.

11.2 ASSESSMENT MECHANISM

The Apollo University offers a student the benefits of Choice Based Credit System. Every paper is allotted a certain number of credits as per the UGC norms. A student is awarded the specified credits on obtaining a pass in the respective paper.

The Choice Based Credit System (CBCS) has been adopted for all UG and PG Courses from the year 2021-22 onwards as per the recommendations of the A.P. State Council for

Higher Education (APSCHE). The structure of undergraduate programmes provides a wide range of choice for students to opt for courses based on their eligibility, aptitude and career goals.

11.3 Semester End Examination

The End semester examination will be a comprehensive examination of 3 hours duration. Two End Semester examinations are conducted in a year:-

- Odd semester examinations in November/ December and Even semester examination in May/June.
- Practical examination / Project viva will be held 2 weeks prior to the theory semester end examinations.

Under-Graduation Programs

Course	Continuous Assessment	End semester	Aggregate in End semester Examinations
All UG Courses	No passing minimum	40%	40%

11.4 Post Evaluation Programme:

Under the Post Evaluation Programme there are three menus :

- Provision for improvement
- Re-totaling and Revaluation of answer scripts
- Restrictions to appear for the examinations

11.5 Provision for improvement

A student who passes a paper in the first attempt can reappear for the same paper in the succeeding End-of-Semester examination only, for improving his/her marks. Re-appearance for improvement is allowed for theory and practical subjects of all semesters, except for the final semester subjects. A revised mark statement will be issued after withdrawing the previous one, if the marks obtained in improvement are higher than the marks awarded earlier. When there is no improvement, there shall not be any change in the original marks already awarded. The improved marks shall be considered for classification but not for ranking.

Provision for Re-totaling and Revaluation of valued answer scripts

- UG/PG candidates may apply for re-totaling / revaluation of valued answer scripts, to the Controller of Examinations through the Heads of Departments and Principal / Dean, in the prescribed forms, remitting the prescribed fee within 7 days from the date of publication of results. Revaluation of answer scripts is permissible only for the current semester papers and not for any arrear paper.
- Those who wish to apply for revaluation of final semester papers can do so within five days from the date of publication of results. In re-valuation, the answer papers will be valued by an external examiner and if there is a difference of 15 marks between the two

evaluations then the script will be sent for third valuation which is final, and the mark awarded by the third examiner will be taken into the account.

- A revised mark statement will be issued after withdrawing the previous one, if the marks obtained in revaluation / retotaling are higher than the marks obtained earlier. In other cases, the original marks obtained earlier will be retained and the matter will be intimated to the student concerned as 'No change'.
- A candidate who applies for revaluation should not apply for retotaling.

Restrictions to appear for the examinations

Candidates who fail in any of the papers in the UG and PG End semester examinations shall complete the paper concerned within N+2 years from the date of admission to the particular course. If they fail to do so, they shall re-register their names and take the examination in the texts/revised regulations/syllabus of the paper prescribed for the subsequent batch of candidates, in force at the time of their reappearance. In the event of removal of that paper consequent to change of regulation and/or curriculum after N+2 years period, the candidate shall have to take up an equivalent paper in the revised syllabus as suggested by the Chairman, Board of Studies concerned.

12. BETTERMENT OF GRADES

A student who has secured only a Pass or Second class and desires to improve his/her Class can appear for Betterment Examinations only in Theory courses of any Semester of his/her choice, conducted in Summer Vacation along with the Special Examinations. Betterment of Grades is permitted 'only once' immediately after completion of the program of study.

13. DETENTION AND RE-ADMISSION

If a student fails to meet the minimum attendance requirement or minimum standards for academic progression, the concerned academic head will recommend for detention, and it will be notified by the concerned Dean of the School. The students who are detained in the current semester will not be allowed to register for the next semester and they have to repeat the same semester.

The candidates who are detained or availed academic break or suspended in the previous semester/academic year and want to continue their study shall apply for re-admission to the university. The candidates shall request for re-admission to the respective Head of the Department, with details viz., Full Name, Registration Number, Department, School, Fee payment particulars with proofs and reasons for discontinuations. The concerned academic head will forward it to the Registrar with specific comments. The Registrar will notify the decision of re-admission which shall include the prescribed fee particulars, semester/ year into which readmission is granted and additional courses to be completed by the student (if any). The candidates should apply for re-admission in advance, that is before the commencement of the semester.

14. GROOMING AND ATTIRE FOR STUDENTS

Grooming and Etiquette is of great significance in the dynamic of shaping one's Personality. The Apollo University stands by a *Code of Grooming, Attire and Etiquette* that promotes a professional standard: Academic Day; Campus Placements and Non-Academic Hours on Campus.

The Dress Code to be in compliance on academic premises while attending: Formal Functions of the Institution / Lectures / Practical's / Dining Area / Library / Labs / Office Areas.

Students shall follow appropriate attire during Academic and Non-Academic hours on the campus. Students shall wear clean, neat, pressed, and presentable clothing, and command respect by dressing in accordance with responsible personal norms. Students shall always wear The Apollo University ID Card with the Lanyard.

Grooming and Formal Wear - Boys:

Formal Shirts / T-Shirts with a Collar should preferably be tucked in with a Formal pair of Pants Shoes and Socks to complete the Formal Attire. Personal Hygiene should be followed, and Hair should be well groomed.

Smart Casuals for Boys:

Long Kurtas / Formals / Semi-Formal Shirts with Jeans.

Grooming and Formal Wear - Girls: Sarees / Salwar Suits / Leggings or Jeggings with Long Kurtis / Long Frocks / Long Skirts / Palazzos. Complement the outfit with proper footwear. Personal Hygiene should be followed, and Hair should be well groomed.

Smart Casuals for Girls:

Jeans with long Kurtis / Long Skirts / Long Frocks.

Attire for Non-Academic Hours On Campus:

The Students should be neatly attired during Non-Academic Hours on Campus.

Dress Code for Boys:

Jeans / Track Suits / T-Shirts / Trousers / Shirts.

Dress Code for Girls:

Jeans / T-Shirts or Blouses / Salwar Suits / Palazzos / Leggings or Jeggings with Long Tops / Sarees / Long Skirts / Track Suits.

DO'S AND DO'NTS FOR BOYS AND GIRL STUDENTS OF THE UNIVERSITY:

- To wear modest clothing that reflects the essence of good personal grooming standards.
- To refrain from wearing Sleeveless Clothing; Shorts; Short Tops, etc.,

PLEASE NOTE: The decision as to what constitutes Appropriate Attire vests with the Authorities of The Apollo University.

15. ELIGIBILITY FOR AWARD OF THE DEGREE

The undergraduate degree will be of either 3- or 4-years of duration. Post-graduation programs may be of 2-years of duration for students who have completed 3-years or 4-years of bachelor's program.

A student shall be declared as eligible for the award of the degree if the candidate has successfully secured the minimum number of required credits as specified in the curriculum corresponding to the branch of his/her study within the stipulated time.

After successful completion of the program, a provisional certificate cum memorandum of grades (PCMG) will be issued to the students. The PCMG includes the secured grades and class achieved in chosen program and specialization if any, along with grades and CGPA secured by the student. The original degree will be presented in the subsequent convocation.

16. DISCRETION POWER

Not with-standing anything contained in the above sections, the Vice Chancellor may review all exceptional cases, and give his decision, which will be final and binding.

ANNEXURE 1
ELIGIBILTY FOR QUALIFYING EXAM FOR UNDERGRADUATE PROGRAMS

Program Type	Program Name	Eligibility
Bachelor's	**B. Sc. Renal Dialysis Technology**	The student seeking admission in B.Sc. Dialysis Therapy technology program should have a minimum 60% marks in 12^{th} grade or equivalent exams with Chemistry and Physics as compulsory subjects. The admission is based purely on merit. During the admission process, the University follows reservation policy as decided by the State

ANNEXURE 2
PROGRAMS OFFERED BY SCHOOL OF HEALTH SCIENCES
FROM ACADEMIC YEAR 2021-22

Sl. No.	Program	Expanded	Level	Minimum Duration in Years (N)
1	B.Sc.	Anesthesiology & Operation Theatre Technology (AOT)	Bachelor's	4
2	B.Sc.	Emergency Medical Technology (EMT)	Bachelor's	4
3	B.Sc.	Imaging Technology (IMT)	Bachelor's	4
4	B.Sc.	Medical Laboratory Technology (MLT)	Bachelor's	4
5	B. Optom	Optometry (OPT)	Bachelor's	4
6	B.Sc.	Physician Assistant (PHA)	Bachelor's	4
7	B.Sc.	Renal Dialysis Technology (RDT)	Bachelor's	4
8	B.Sc.	Respiratory Therapy Technology (RTT)	Bachelor's	4
9	BPT	Bachelor of Physiotherapy (BPT)	Bachelor's	4.5

The various courses of the AHS Programme are categorized in terms of their academic affinity or their functional objectives as Core Courses, Elective Courses

Core courses: Core courses are compulsory sets of papers. (They are in accordance with the syllabi of the University)

Electives courses: There will be a specified number of elective courses classified as Open Electives. The students are offered a pool of different elective courses from which they will choose the course/courses as per their interest and credit requirements. A faculty advisor may be appointed to guide the students to opt for the elective courses that are relevant to the subject in which the student is registered for the degree.

B. Sc. RENAL DIALYSIS TECHNOLOGY

SCHEME AND SYLLABUS

Programme Structure of AHS:

1st Semester						
Course Code	**Course Name**	**Periods per week**			**Credits**	**Hours per week**
		L	**T**	**P**		
AHSJ1301	Anatomy	3	1	2	5	5
AHSJ1302	Physiology	3	1	2	5	5
AHSJ1303	Biochemistry	3	1	2	5	5
TAUT1101	University Core -I	3	0	0	3	3
TAUT1201	University Elective I	3	0	0	3	3
--	Design Thinking	0	0	0	0	1
--	Soft Skills	0	0	0	0	1
--	Mentoring	0	0	0	0	2
--	Technical Seminar	0	0	4	0	2
--	Library	0	0	0	0	2
--	Physical Activity	0	0	0	0	2
--	Extra-curricular activities	0	0	0	0	2
--	Co-curricular activity	0	0	1	0	1
--	Self-Learning	0	0	1	0	2
TOTAL		**15**	**3**	**6**	**21**	**36**

2nd Semester						
Course Code	**Course Name**	**Periods per week**			**Credits**	**Hours per week**
		L	**T**	**P**		
AHSJ1304	Microbiology	3	1	2	5	5
AHSJ1305	Pathology	3	1	2	5	5
AHSJ1306	Pharmacology	3	1	2	5	5
TAUT1102	University Core – II	3	0	0	3	3
TAUT1202	University Elective II	3	0	0	3	3
RDTT1501	Programme Core - Fundamentals of Dialysis Technology	3	0	0	3	3
--	Mentoring	0	0	0	0	1
--	Co-curricular activity	0	0	0	0	2
--	Self-Learning	0	0	0	0	2
--	Physical Activity	0	0	2	0	3
--	Extra-curricular activities	0	0	2	0	2
--	Library	0	1	0	0	2
	TOTAL	**18**	**4**	**6**	**24**	**36**

3rd Semester						
Course Code	**Course Name**	**Periods per week**			**Credits**	**Hours per week**
		L	**T**	**P**		
RDTT2501	Anatomy and Physiology Related to Renal Dialysis Technology	3	1	0	4	4
RDTT2502	Pharmacology Related to Renal Dialysis Technology	3	1	0	4	4
RDTT2503	Concepts of Renal Diseases	3	1	0	4	4
RDTL2501	Clinical skills I	0	0	10	5	10
TAUT2101	University Core (Health and wellness)	3	0	0	3	3
TAUT2201	University elective – III	3	0	0	3	3
--	Seminar	0	0	0	0	1
--	Library	0	0	0	0	2
--	Extra-curricular activities	0	0	0	0	2
--	Mentoring	0	0	0	0	2

		Total	**15**	**3**	**10**	**23**	**35**

4th Semester						
Course Code	**Course Name**	**Periods per week**			**Credits**	**Hours per week**
		L	**T**	**P**		
RDTT2504	Applied Pathology and Microbiology related to Renal Dialysis Technology	3	1	0	4	4
RDTT2505	Nutrition in Renal Disease	3	1	0	4	4
RDTT2506	Instrumentation in Renal Dialysis Technology	3	1	0	4	4
RDTL2502	Clinical skills II	0	0	20	10	20
--	Seminar	0	0	0	0	1
--	Library	0	0	0	0	1
--	Extra-curricular activities	0	0	0	0	1
	Mentoring	0	0	0	0	1
	Total	**9**	**3**	**10**	**22**	**36**

5th Semester						
Course Code	**Course Name**	**Periods per week**			**Credits**	**Hours per week**
		L	**T**	**P**		
RDTT3501	Applied techniques in dialysis	3	1	0	4	4
RDTT3502	Applied Dialysis Therapy	3	1	0	4	4
RDTT3503	Advanced extracorporeal therapies	3	1	0	4	4
RDTL3501	Clinical skills III	0	0	16	8	16
RDTT3601a RDTT3601b RDTT3601c	Programme electives I a. Basics of clinical skills learning. b. Hospital operation management* c. Biomedical Instruments in Dialysis*	3	0	0	3	3
--	Seminar	0	0	0	0	1
--	Library	0	0	0	0	1
--	Extra-curricular activities	0	0	0	0	2
	Mentoring	0	0	0	0	1
	Total	**12**	**3**	**16**	**23**	**36**

6th semester						
Course Code	Course Name	Periods per week			Credits	Hours per week
		L	T	P		
RDTT3504	Applied techniques in Peritoneal dialysis	3	1	0	4	4
RDTT3505	Medical management in dialysis patients	3	1	0	4	4
RDTT3506	Recent advancements in dialysis and transplantation	3	1	0	4	4
RDTL3502	Clinical skills IV	0	0	16	8	16
RDTT3602a RDTT3602 b RDTT3602c	Programme electives II • Biostatistics and research methodology. • Imaging and interpretation in renal failure*. • Asepsis in Dialysis Therapy*	3	0	0	3	3
--	Seminar	0	0	0	0	1
--	Library	0	0	0	0	1
--	Extra-curricular activities	0	0	0	0	2
--	Mentoring	0	0	0	0	1
	Total	12	3	16	23	36

***Applicable from 2023 Admitted Batches**

7th Semester						
Course Code	Course Name	Periods per week			Credits	Hours per Semester
		L	T	P		
RDTI4501*	Internship-I Evaluation			48	25	1104
TOTAL				48	25	1104

8th Semester						
Course Code	Course Name	Periods per week			Credits	Hours per Semester
		L	T	P		
RDTI4502*	Internship-II Evaluation			48	25	1104
RDTP4501	Project			8	6	180

TOTAL			**51**	**31**	**1284**

Internship (Practical training:1500 Hours)	
	Hours
Priming and initiation of HD Circuit	**100**
AVF/AVG cannulation	**250**
Care of temporary vascular access	**100**
Termination of HD	**100**
CRRT	**100**
PD (APD &CAPD)	**100**
Hemoperfusion	**20**
Plasmapheresis	**30**
HD exposure in various ICUs	**100**
Patient care during HD	**200**
Assisting minor procedures in the HD centre	**50**
Assisting Kidney Biopsy	**50**
Phlebotomy	**50**
Water Treatment Plant Management	**100**
Project	**150**

Assessment and Evaluation

The evaluation will be continuous, and the weight ages of various components are given in Table 1 (For Theory courses) and Table 2 (for Practical Courses).

For Theory Courses	
Sessional Tests (STs)/Midterm exams	40
End Term Examination	60
Total	**100**

Table 1: Evaluation Components for Theory Course

There are three Sessional Tests (STs)/Midterm for all theory papers, the average of the best two is considered. The policy on the evaluation component – 'Quizzes / Tutorials / Assignments' is decided by the course coordinator and HOD and is announced separately for each course. The End Term examination for practical courses includes the conduct of experiments and an oral examination (viva voce).

For Internship	
EXTERNAL COMPONENTS: 60 marks	
Performance	15
Logbook	15
Discipline	10
Group Project	20
INTERNAL COMPONENTS: 40 marks	
Presentation and Viva	40
Total	100

Table 3: Evaluation Components for Internship

Clinical skills	
EXTERNAL COMPONENTS:	**20 marks**
Presentation	10
Viva	10
INTERNAL COMPONENTS:	**80 marks**
Continuous Evaluation I	20
Continuous Evaluation II	20
Continuous Evaluation III	20
Logbook	20
Total	100

Table 4: Evaluation Components for Clinical Skills

1st Semester						
Course Code	**Course Name**	**Periods per week**			**Credits**	**Hours per week**
		L	T	P		
AHSJ1301	Anatomy	3	1	1	5	5
AHSJ1302	Physiology	3	1	1	5	5
AHSJ1303	Biochemistry	3	1	1	5	5
TAUT1101	University Core -I	3	0	0	3	3
TAUT1201	University Elective I	3	0	0	3	3
--	Design Thinking	0	0	0	0	1
--	Soft Skills	0	0	0	0	1
--	Mentoring	0	0	0	0	2
--	Technical Seminar	0	0	1	0	2
--	Library	0	0	0	0	2
--	Physical Activity	0	0	0	0	2
--	Extra-curricular activities	0	0	0	0	2
--	Co-curricular activity	0	0	1	0	1
--	Self-Learning	0	0	1	0	2
TOTAL		**15**	**3**	**6**	**21**	**36**

University Electives - I		
S. No	**Name of the Course**	**Host Department**
1	Basics of Physiotherapy	School of Health Sciences – Physiotherapy
2	Biostatistics	School of Health Sciences – BMS & GMB
3	Constitution of India	School of Social Sciences
4	Ethical Hacking	School of Technology - CSE
5	Fundamentals of Computers	School of Technology - CSE
6	Gender and Development	School of Social Sciences
7	Leadership Development	School of Management
8	Mathematical Thinking	School of Technology
9	Nursing	Apollo Institute of Nursing
10	One Health	School of Health Sciences – PH
11	Basic emergency care and life support skills	School of Health Sciences – AHS
12	Basics of Health Management	School of Health Sciences – AHS
13	Entrepreneurship	School of Management
14	Managerial Economics	School of Management
15	Organic Farming	School of Health Sciences – BMS & GMB
16	Personality Development	School of Health Sciences – Psychology
17	Social Entrepreneurship	School of Management

1st YEAR: I SEMESTER

AHSJ1301	ANATOMY	L	T	P	C
		3	1	2	5

Course Description:

This course will cover anatomy with special emphasis on general anatomy including anatomical position, anatomical planes, cell structure, tissues and upper and lower limbs focussing on important muscles, arteries, veins, and nerves which are of significant clinical importance. This course also covers important and relevant anatomical knowledge of all systems namely nervous, cardiovascular, respiratory, gastrointestinal, reproductive, and excretory systems.

This course also covers practical teaching of osteology, gross anatomy of important viscera, radiology and histology.

Course Objectives:

Students undergoing this course are expected to:

1. Understand and learn the origin, insertion, action, and nerve supply of clinically important muscles.
2. Understand and learn the origin, course, branches and clinical aspects of important vessels and nerves.
3. Explain the location, external features, relations, blood supply, clinical importance of organs of nervous, cardiovascular, respiratory, gastro-intestinal, reproductive, endocrine and excretory systems.

THEORY **Total: 60 Hrs**

UNIT-I **12 Hrs**

INTRODUCTION

- Introduction to anatomy
- Define Anatomy and list its sub-divisions.
- Describe the Anatomical position.

General Histology

- Describe the human cell and its organelle.
- Describe the types of cell division and give examples.
- List out the types of tissues and describe their basic structure.
- Briefly describe the types of connective tissue including specialized connective tissue
- Describe the types and functions of epithelia.

UPPER LIMB

- Name the important bones, muscles, blood vessels & nerves of the upper limb.
- Briefly describe the movements of joints and the nerve supply and actions of the important muscle groups of the upper limb
- Describe the location and course of the major blood vessels & nerves of the upper limb.

UNIT-II **12 Hrs**

LOWER LIMB

- Name the important bones, muscles, blood vessels & nerves of the lower limb
- Briefly describe the movements of joints, nerve supply and actions of the important muscle groups of the lower limb
- Describe the location and course of the major blood vessels & nerves of the lower limb

RESPIRATORY SYSTEM

- Name the parts of the respiratory system.
- Briefly describe the pleura and its disposition
- Describe the external features of the lungs and their relations.
- Name the bronchopulmonary segments in each lung and explain their significance.
- Briefly describe the mechanism of respiration

UNIT-III

CARDIOVASCULAR SYSTEM **12 Hrs**

- Describe the important external and internal features of the heart.
- Briefly describe the blood supply of the heart
- Describe the circulation of blood through the heart and types of circulation.
- Describe the aorta and its branches.
- List out the major veins that join into the superior and inferior vena cavae.
- Briefly describe the lymphatic system and its function

NERVOUS SYSTEM

- Classify nervous system.
- Describe briefly the external and internal features of the spinal cord, its coverings and blood supply.
- Describe briefly the external and internal features of the brainstem and the functional significance of the tracts and nuclei seen in the brainstem.
- Briefly describe the cerebellum and its peduncles
- Describe the cerebrum in brief and its lobes and functional areas of importance.
- Briefly describe the circulation of cerebrospinal fluid

UNIT-IV **12 Hrs**

ENDOCRINE SYSTEM

- Name the endocrine glands and the hormones secreted by each.
- Briefly describe the anatomy and physiology of the pituitary, thyroid, parathyroid, Adrenal, and pancreas.

REPRODUCTIVE SYSTEM

- Describe briefly the male reproductive system.
- Describe briefly the female reproductive system.
- List out the hormones released by the organs in the reproductive system**.**

EXCRETORY SYSTEM

- Describe briefly the excretory system.

UNIT-V **12 Hrs**

GASTROINTESTINAL SYSTEM

- Briefly describe the extent, important anatomical features, and relations of various parts of the gastrointestinal tract.
- Describe the important anatomical features, surface anatomy, relations and functions, and blood supply of the liver.
- Briefly describe the parts, important features and functions of the oesophagus, stomach, duodenum, small intestine, and large intestine.
- Describe briefly the important anatomical features, position and relations and functions of pancreas and spleen.
- Briefly describe the blood supply of the gastrointestinal system.

Course outcomes:

At the end of this course, students should be able to:

- Explain the origin insertion, action, nerve supply, and clinical importance of muscles.
- Understand and learn the origin, course, branches and clinical aspects of important vessels and nerves.
- Explain the location, external features, relations, blood supply, and clinical importance of various organs of nervous, cardiovascular, respiratory, gastro-intestinal, reproductive, and excretory systems.

PRACTICALS **Total: 30 Hrs**

Course Objective: The course will cover Anatomy with special emphasis on osteology, histology, demonstration of viscera, radiology.

The assessment of the students will be undertaken with the help of following exercises.

- Spotters
- Viva

Textbooks:

1. Manipal manual of Human anatomy
2. Human anatomy & Physiology for Nursing – Mahindra Kumar Anand & Meena Verma
3. Understanding Human Anatomy & physiology – Willian Davis (McGraw Hill)
4. Anatomy & physiology – Kaarna Muni Shekhar
5. Textbook of Anatomy – Chaurasia
6. Textbook of Anatomy – TS Ranganathan Human Anatomy – Fattana.

Reference Books:

Textbook of anatomy-Vishram Singh

1st YEAR: I SEMESTER

AHSJ1302	PHYSIOLOGY	L	T	P	C
		3	1	2	5

Course Description:

The goal of this course is to help students in understanding functions, regulation, and integration of organ systems of the human body.

Course Objectives:

- Describe the concept of homeostasis.
- Interpret the structure of the cell membrane and describe the transport mechanisms for solute and water across the cell membrane. Explain the basis of membrane potential.
- Describe the structure and functional organization of the human nervous system and its subdivisions. Discuss the role of nervous system in homeostasis.
- Understand how heart and blood vessels work to maintain a constant delivery of blood flow (oxygenated) to all the tissues and simultaneously how the blood is returned (deoxygenated/ venous blood) to the heart. Explain how cardiovascular system adjust its activity to meet the demands placed by the body during activities of daily life (E.g., exercise)
- Describe the basic anatomy and functions of the pulmonary system.
- Explain the role of kidney in blood pressure, electrolyte, and fluid homeostasis.
- Elaborate on how the structure of gastrointestinal tract suited for digestion and absorption. Discuss the mechanism of digestion and absorption at various levels of gastrointestinal tract.
- Describe how endocrine organs are involved in regulation of growth, metabolism, fluid and electrolyte balance and reproduction.

THEORY **Total: 60 Hrs**

UNIT-I **10 Hrs**

1. General Physiology (Cell Physiology)

- Homeostasis
- Cell structure and functions of cell with special emphasis on characteristics of cell membranes, Transport mechanisms across cell membrane.
- Body Fluid Compartments (volume, composition, and units to measure solute concentration).

2. Nerve-Muscle Physiology

- Neuron (structure and function), Classification of neurons, Neuroglia, Type of nerve fibres, Resting membrane potential and Action potential.
- Neuromuscular Junction (skeletal muscle) and Neuromuscular blocking drugs
- Classification and functions and structure of muscles, Excitation contraction coupling, Mechanism of muscle contraction
- Differences between skeletal, smooth, and cardiac muscle.

- Applied physiology: Nerve injury, Myasthenia gravis, Neuromuscular junction blockers, Muscular dystrophy.

3. Blood (Haematology)

- Composition of blood, functions of cellular (RBC, WBC, and platelets) and non-cellular (plasma and plasma proteins) components of blood.
- RBC (Erythrocyte): Erythropoiesis and factors affecting it, Normal count, and variations. Haemoglobin: Functions and recycling of hemoglobin, Jaundice, Anemia.
- WBC: Classification, morphology, site of production, functions, normal and differential count, and variations. Immunity.
- Platelets: Origin, normal count, and functions (role in hemostasis).
- Hemostasis: Clotting factors and their role in hemostasis. Disorders of Hemostasis.
- Blood groups: ABO & Rh systems, Erythroblastosis fetalis, Hazards of mismatched blood transfusion
- Reticuloendothelial system

UNIT-II **13 Hrs**

1. Nervous system (Central Nervous system)

- Parts (gross connections)
- **Cerebral hemisphere**: parts, corpus callosum, cerebral cortex, and functions of frontal, parietal, temporal, and occipital lobes of the cerebrum.
- Connections between motor cortex and subcortical structures and spinal cord (descending tracts). Connections between spinal cord and thalamus- somatosensory cortex of parietal lobe (ascending tracts).
- Upper and lower motor neurons
- Descending and ascending tracts (origin, location, course, and termination)
- **Subcortical structures**
  Basal ganglia, Thalamus, Hypothalamus, and Limbic system. Nuclei of subcortical structures, its connections with various parts of the brain and its functions.
- **Brain stem**: (Midbrain, Pons, and Medulla oblongata)
  Nuclei, connections, and its functions
- **Cerebellum**
  Physiological anatomy: lobes, cerebella cortex, connections (afferent and efferent), functions and applied aspects.
- Reticular formation and its functions
- Sleep
- **Spinal cord:** parts of gray matter and constituents of white matter. Applied physiology.

Peripheral Nervous System

- Divisions and constituents of the peripheral nervous system
- Functions of cranial and spinal nerves

- Physiological anatomy of somatic nervous system and its functions
- Physiological anatomy of autonomic nervous system (sympathetic and parasympathetic) and its functions

2. Special senses

- **Vision** –Functional anatomy of eye, visual pathway. Applied physiology: lesions along visual pathway and its effect. Refractive errors.
- **Hearing**– Physiological anatomy of ear, Mechanism of hearing, and auditory pathway. Applied physiology: deafness.
- **Olfaction** –receptors and pathway, function, and its applied physiology
- **Gustation**-modalities, receptor, function, taste pathway, and its applied physiology

UNIT- III **14 Hrs**

1. Cardiovascular system

- Physiological anatomy of the heart, autonomic innervation, and its action on the heart, pulmonary and systemic circulation
- Properties of cardiac muscle
- Conducting system of the heart
- Electrocardiogram
- Cardiac cycle, Heart sounds.
- Vascular system (branching), hemodynamics, factors influencing resistance to the blood flow.
- Cardiac output: definition, factors regulating it and measurement of cardiac output.
- Blood pressure: Definition, components, determinants of blood pressure and factors regulating it.
- Lymphatic system and its functions
- Pulse
- Applied aspects of cardiovascular physiology: myocardial infarction, heart failure, shock, and others
- Cardiovascular changes during exercise

2. Respiratory System

- Physiological anatomy of the respiratory tract, conducting and respiratory zone of the respiratory tract, pleural and pleural cavity, mechanics of respiration, changes in intrapleural and intrapulmonary pressures during respiratory cycle.
- Compliance and factors affecting it (surface tension and surfactant), respiratory distress syndrome.
- Lung volumes and capacities
- Respiratory membrane, partial pressure of gases, transport of O_2 and CO_2, Oxyhemoglobin dissociation curve.
- Regulation of respiration (Chemical and Neural)
- Hypoxia, dyspnea, apnea, asphyxia, and cyanosis
- Artificial respiration

UNIT-IV **13 Hrs**

1.Digestive System

- Introduction to Gastrointestinal system and Physiological anatomy of the wall of Gastrointestinal tract
- **Salivary glands** and its function, mastication, pharynx, and Deglutition
- **Stomach:** physiological anatomy, composition of Gastric juice (HCL secretion), its functions and its regulation.
- Vomiting reflex.
- **Liver and gall bladder**: Bile composition and its functions, and other functions of the liver, functions of the gall bladder. Enterohepatic circulation
- **Pancreas:** Pancreatic juice composition, its functions and regulation of its release.
- **Small intestine:** Succus entericus composition, functions, and regulation of its release. Small intestinal motility and its functions.
- **Large intestine:** function, movements, and Defecation reflex
- Digestion and absorption of carbohydrates, fats, and proteins.

2.Renal System

- Physiological anatomy & functions of the kidney, blood supply and special features of blood flow to the kidney. Structure and types of nephrons
- Histology of the renal corpuscle: Juxtaglomerular apparatus.
- Mechanisms of formation of urine: Glomerular filtration rate (GFR), Tubular reabsorption (Special emphasis on reabsorption of water, Na+, Glucose, HC03- and Ca2+) and tubular secretion (special emphasis on secretion of K+ and H+). Renal handling of urea, Renal threshold, and Tubular maximum.
- GFR: Starling forces acting across the glomerular capillaries and factors affecting GFR
- Concentration of urine: role of counter-current multiplier and counter-current exchanger
- Role of kidney in Regulation of blood pressure and pH
- Diuresis, diuretics, renal clearance. Renal function tests.
- Artificial kidney (Dialysis)
- Skin: Physiological anatomy of the skin and its role in temperature regulation.

UNIT-V **10 Hrs**

1. Endocrine System

- Physiological anatomy & functions of the kidney, blood supply and special features of blood flow to the kidney. Structure and types of nephrons
- Histology of the renal corpuscle: Juxtaglomerular apparatus.
- Mechanisms of formation of urine: Glomerular filtration rate (GFR), Tubular reabsorption (Special emphasis on reabsorption of water, Na+, Glucose, HC03- and Ca2+) and tubular secretion (special emphasis on secretion of K+ and H+). Renal handling of urea, Renal threshold, and Tubular maximum.

- GFR: Starling forces acting across the glomerular capillaries and factors affecting GFR
- Concentration of urine: role of counter-current multiplier and counter-current exchanger
- Role of kidney in Regulation of blood pressure and pH
- Diuresis, diuretics, renal clearance. Renal function tests.
- Artificial kidney (Dialysis)
- Skin: Physiological anatomy of the skin and its role in temperature regulation.

2. Reproductive system

- Introduction to reproductive system, sex differentiation, and Puberty.
- **Male reproductive system**, physiological anatomy of the testis and its functions, functions of testosterone, Spermatogenesis, and its regulation.
- **Female reproductive system**; physiological anatomy of ovaries and uterus.
- Functions of ovaries; Oogenesis and ovarian cycle, functions of Estrogen and Progesterone, and menstrual cycle.
- Physiological changes during pregnancy, pregnancy tests, parturition & lactation.
- Male & Female contraceptive methods

Course Outcome:

At the end of the course, students should

- have thorough knowledge and appreciation of the concepts in Human physiology
- understand the role of all organ systems in homeostasis
- understand how the organ systems work in unison to bring out integrated physiological responses to challenges such as exercise, fasting and ascent to high altitude, and how they can sometimes fail
- be able to perform, analyze and report on experiments and observations in physiology
- be able to apply their knowledge in their respective branches of Allied Health Sciences

PRACTICALS **Total: 30 Hrs**

HEMATOLOGY

- Microscope
- Estimation of Hemoglobin
- Estimation of bleeding time and clotting time
- Measurement of ESR – demo
- Estimation of PCV – demo
- Perform RBC count of given blood sample.
- Perform WBC count of given blood sample.
- Perform a Differential Leucocyte Count.
- Calculation of blood indices

CLINICALS

A. Cardiovascular system

- Examination of radial pulse
- Measurement of blood pressure
- Recording of ECG- demo
- Measure of weight and height and calculate body mass index
- Demonstrate JVP, apex beat, percussion of cardiac borders, auscultation of heart sounds.

B. Respiratory system

- Measurement of respiratory rate and temperature
- Examination of respiratory system and temperature
- Spirometry demo

C. Nervous system

- Examination of cranial nerves
- Motor system examination
- Examination of reflexes
- Examination of the sensory system

D. Special senses

- Eye: Tests for vision (Acuity and colour perception)
- Ear: Hearing tests

Textbooks:

1. HH Sudhakar D Venkatesh "Basics of Medial Physiology", 5th edition, Wolters Kluwer,2023.
2. K Sembulingam, Prema Sembulingam, "Essentials of Physiology for Paramedical Students" JAYPEE, 2021.

Reference Books:

1. John E Hall and Michael E. Hall, Guyton & Hall, "Textbook of Medical Physiology" 14th edition, 2020
2. Eric P. Widmaier, Hershel Raff, and Kevin T. Strang "Vanders Human Physiology" 15TH edition, 2018.

1st YEAR: I SEMESTER

AHSJ1303 **BIOCHEMISTRY** **L T P C**
3 1 2 5

Course Description:
This course introduces students to the structure and function of essential biomolecules, which are the organic compounds that constitute the various components of living cells. The course covers the biochemical reactions that facilitate cellular growth, maintenance, reproduction, and energy utilization and storage.

Course Objectives:
By the end of this course, students will be able to:

- Understand the structure and functions of the cell membrane and organelles.
- Comprehend the chemistry of carbohydrates, lipids, proteins, and nucleic acids.
- Explain enzyme actions, mechanisms, inhibition, and clinical enzymology.
- Grasp the significance of nutrition, including vitamins and minerals.
- Describe the structure and functions of immunoglobulins and haemoglobin.

THEORY **Total: 60 Hrs**

UNIT-I **4 Hrs**

Cell and Membrane: Cell organelles and their functions, membrane structure, transport mechanisms across membranes, ionophores, membrane proteins, and transporters.

UNIT- II: **15 Hrs**

Chemistry of Biomolecules

- **Chemistry of Carbohydrates:** Definition, classification, important monosaccharides, stereoisomers, anomers, mutarotation, and reactions of monosaccharides (tautomerization, reduction, dehydration, osazone formation). Important disaccharides and polysaccharides.
- **Chemistry of Lipids:** Definition, classification, nature of fatty acids, triacylglycerol, saponification, iodine number, rancidity, antioxidants, complex lipids, steroids, and cholesterol functions.
- **Chemistry of Amino Acids, Peptides, and Proteins:** Definition, classification, peptide bonds, biologically important peptides, essential and non-essential amino acids, protein structure (primary, secondary, tertiary, quaternary), precipitation, denaturation, coagulation, and color reactions of amino acids.
- **Chemistry of Nucleic Acids:**Nitrogenous bases, nucleosides, nucleotides, DNA, genes, and types of RNA involved in protein synthesis.

UNIT-III: **5 Hrs**

Enzymes: Definition, classification, factors affecting enzyme activity, mechanism of action, coenzymes, proenzymes, isoenzymes, measurement units, competitive and non-competitive inhibitors, and clinical enzymology with normal values.

UNIT- IV: **12 Hrs**

Nutrition and Vitamins

- **Nutrition:** Calorific values of food, basal metabolic rate, specific dynamic action, energy requirements, nutritional importance of carbohydrates, lipids, proteins, nitrogen balance, protein supplementation, Kwashiorkor, Marasmus, and Recommended Dietary Allowance (RDA).
- **Vitamins:** Overview of chemistry, sources, requirements, biochemical functions, deficiency symptoms of vitamins A, D, E, K, B-complex (thiamine, riboflavin, niacin, pantothenic acid, pyridoxine, biotin, folic acid, B-12), and Vitamin C.
- **Mineral Metabolism:** Classification of macro and micro elements, including sodium, potassium, calcium, phosphorus, iron, iodine, magnesium, copper, zinc, fluoride, manganese, selenium, and molybdenum.

UNIT -V: **4 Hrs**

Immunology and Haemoglobin

- **Immunology:** Definitions of antigens and antibodies, structure and functions of antibodies.
- **Haemoglobin:** Structure and functions of haemoglobin, its derivatives, degradation process, and jaundice.

Course Outcomes:

Upon successful completion of this course, students will be able to:

- Describe the structures and functions of cell membranes and organelles.
- Understand and explain the chemistry and classifications of major biomolecules.
- Classify enzymes and explain their mechanisms, inhibition types, and clinical relevance.
- Comprehend the basics of nutrition, including sources, recommended dietary allowances (RDA), functions, and deficiency symptoms of vitamins and minerals.
- Explain the structure and functions of immunoglobulins and haemoglobin.

Textbooks: latest editions

1. Concise Textbook of Biochemistry for Paramedical Students (2nd Edition, 2023) by DM Vasudevan
2. A Textbook on Biochemistry for Paramedical Students (2022) by Dr. Kiran Dahiya

Reference Book:

1. Textbook of Biochemistry for Medical Students (10th Edition, 2023) by DM Vasudevan

1st YEAR: I SEMESTER

UNIVERSITY CORE - I

TAUT1101 COMMUNICATIVE ENGLISH L T P C

3 0 0 3

Course Description:

The creation of the Course is to facilitate Stakeholders in productively using the Language to functional advantage to form meaningful engagements in a social context and influence their professional dynamic.

Course Objectives:

The objective of this course is to make students to:

1. To expand and enhance vocabulary systematically for clear communication, richer expression, and deeper comprehension across various contexts."
2. To provide the grammatical knowledge and skills necessary to communicate effectively in English, both orally and in writing.
3. To strengthen their ability to write academic papers, essays and summaries using the "Mind Mapping,' dynamic.
4. To enhance communication skills by analyse, evaluate, and express their opinions on various topics, fostering the development of critical thinking abilities
5. To develop proficiency in listening, speaking, reading and writing, enabling individuals to communicate effectively in various real-life situations.

UNIT-I 9 Hrs

Vocabulary and Reading: Special Features of English Vocabulary, Reading With Purpose; Understanding What is Read; Drawing a Conclusion Based on Inferences, Deduction, Reading Between the Lines, Context, Connotation, Higher Order Thinking; How to Explain Specific Information with Clarity; Defining and Giving Reasons; Giving Directions; Professional Vocabulary.

UNIT-II 9 Hrs

Basic Grammar: Subject-Verb Agreement; Verb Tenses; Active-Passive Voice; Direct and Indirect Speech; Question Tags; Degrees of Comparison; Articles; Avoiding Jargon.

UNIT-III 9 Hrs

Writing: Letter Writing; Report Writing; E-Communication, Drafting and Collating Key Information, Taking Notes from Lectures, Reading Materials, Reporting on Minutes of the Meeting, Precis Writing

UNIT-IV 9 Hrs

Basics of Communication: Role of Communication; Purpose of Communication; Barriers to Communication; Verbal and Non-Verbal Communication, Communication at the Workplace; Human Needs and Communication; "Mind Mapping" Communication; E-Communication.

UNIT-V **9 Hrs**

Presentations: Self-Introduction; Individual Presentation; Group Discussions; Debates.

Course Outcomes:

At the end of the course, student will be able to:

1. To review grammatical structures of English and the use of these forms in specific communicative contexts, which include: class activities, homework assignments, reading of texts and writing and functional real-world facets.
2. To improve their accuracy and fluency in producing and understanding spoken and written English and endorse this proficiency in both personal and professional realms.
3. To attain and enhance competence in the four modes of literacy: Writing, Speaking, Reading and Listening.
4. To develop their ability as critical thinkers.
5. To empower the individuals to connect, engage, and thrive in diverse personal and professional environments.

Textbooks:

1. Meenakshi Raman and Sangeeta Sharma, "Technical Communication: Principles and Practice", 3rd Edition, Oxford University Press, 2015.
2. M. Ashraf Rizvi, "Effective Technical Communication", Second Edition, McGraw. Hill Education, 2017.
3. Wilfred Funk and Norman Lewis, "30 Days to a More Powerful Vocabulary", Latest Edition, Pocket Books, 2021.

Reference Books:

1. Grant Taylor, "English Conversation Practice", Tata McGraw-Hill Education India, 2016.
2. Gary Blake and Robert W. Bly, "The Elements of Technical Writing", 2nd Edition, 2000, Longman.
3. Raymond Murphy, "English Grammar in Use", Fourth Edition, Cambridge University Press, 2019.

1st YEAR: I SEMESTER
UNIVERSITY ELECTIVE - I

TAUT1201A	**BASICS OF PHYSIOTHERAPY**	**L T P C**
		3 0 0 3

Course Description:

The course is designed to aim at imparting a basic level health program. This program is formulated to enable student to gain adequate knowledge, skills and leading to an ability to identify the basics of early features of the health issues

Course Objectives:

The objective of this course is to make students to:

1. Gather and interpret information within a holistic framework pertaining to health.
2. The overall content of the curriculum focuses on health care and clinical education experiences for each student
3. Understand the basic fundamentals of physiotherapy
4. Familiarizes participants with different procedures and techniques used in physiotherapy and their practical application across various conditions
5. Provide participants with a substantial understanding of physiotherapy and promote safe practices and ethical behaviour in physiotherapy practice.

UNIT-I Basics of Physiotherapy **5 Hrs**

i. What is Physiotherapy?
ii. Types of Physiotherapy
iii. Benefits of Physiotherapy
iv. Why is Physiotherapy done?

UNIT-II Women's Health **5 Hrs**

i. Pre-natal exercises & Care
ii. Post Natal exercises

UNIT-III Acute injuries & management and the uses of Orthotics & Prosthetics 10 Hrs

i. Mechanism of injury
ii. Acute muscle injuries
   - Muscle strain
   - Risks of muscle strain
   - Muscle imbalance
   - Muscle inflexibility
iii. Ligament sprain and difference between sprain and strain
iv. Orthotics & Prosthetics

UNIT-IV Ergonomics & Health and Aerobics **13 Hrs**

i. work-related musculoskeletal disorders (MSDs).
ii. Risk factors associated with work-related MSDs & Possible Causes

iii. Common ergonomic symptoms
iv. Different types of Ergonomics & principles of ergonomics and v. Ergonomic Control Methods
v. Awkward body postures – hazards
vi. Physical Activity and exercise
vii. Physical Fitness and Maximum Oxygen Consumption
viii. Aerobic Exercise Training and Physiological Response to Aerobic Exercise
ix. Cardiovascular Response to Exercise and Respiratory Response to Exercise
x. Responses Providing Additional Oxygen to Muscle and Exercise Program
xi. Warm-Up Period, Aerobic Exercise Period and Cool-Down Period Application

UNIT-V Education & Awareness about common diseases and BLS 12 Hrs

i. Bell's palsy
ii. Diabetes
iii. Coronary artery heart disease
iv. OA Knee
v. Stroke
vi. LBA
vii. Early identification of congenital anomalies
viii. BLS Theory
ix. BLS Practical's

Course Outcomes:

1. Gain the basic knowledge of Physiotherapy
2. Familiarize the procedures and techniques used in physiotherapy
3. Protect and manage from the sport injuries
4. Gain Knowledge about Ergonomics
5. To maintain physical fitness

Textbooks:

1. Physiotherapy In Obstetrics And Gynecology-Polden And Mantle, Jaypee Brothers
2. Women's Health- Ruth Sapsford, Lippincott,1998
3. Textbook of orthopedics medicine Vol I & II by James Cyriax – Bailliere
4. Susan B O'Sullivan, Physical Rehabilitation 6th Edition, 6 edition F A Davis; 2013. ISBN-13: 978-0803625792
5. Arias" Practical Guide To High-Risk Pregnancy And Delivery By Amarnath Bhide, Sabaratnam Arulkumaran

Reference Books:

1. John Ebenezer- Essentials of Orthopedics for Physiotherapists- 3rd edition 2016
2. Davidson's principles and practice of medicine
3. Fundamentals of Ergonomics in Theory and Practice- Alan Hedge- 2019
4. Introduction to Ergonomics, Third Edition" -Robert Bridger- 2018

5. Human Factors and Ergonomics in Practice: Improving System Performance and Human Well-Being"- Steven Shorrock, Claire Williams- 2020
6. Acute Care Handbook for Physical Therapists- Jaime C. Paz, Michele P. West- 2019
7. Sports Injury Prevention and Rehabilitation: Integrating Medicine and Science for Performance Solutions" David Joyce, Daniel Lewindon- 2015
8. Orthotic Intervention for the Hand and Upper Extremity: Splinting Principles and Process"- Marylyn A. Jacobs, Noelle M. Austin- 2013
9. Prosthetics and Orthotics: Lower Limb and Spine"- Joan E. Edelstein, Alex Moroz- 2017
10. "Essentials of Physiotherapy"- Prakash Narain Tandon- 2016
11. Pathology for the Physical Therapist Assistant - Catherine C. Goodman, Kenda S. Fuller- 2020 (3rd Edition)

1st YEAR: I SEMESTER
UNIVERSITY ELECTIVE - I

TAUT1201B	**BIOSTATICS**	**L T P C**
		3 0 0 3

Course Description:

Biostatistics is the application of statistical methods to biological and health-related fields. This course provides a comprehensive introduction to the principles and techniques of biostatistics essential for conducting research in medicine, public health, and biology. Students will learn how to effectively collect, analyze, and interpret data from biological and health sciences, with a focus on understanding and addressing key issues such as experimental design, sampling methods, data visualization, hypothesis testing, and regression analysis.

Course Objectives:

1. Gain a solid understanding of biostatistical principles including descriptive statistics, probability, hypothesis testing, and regression analysis.
2. Apply these principles to analyze data from biological and health sciences, focusing on experimental and observational studies.
3. Critically interpret statistical results and effectively communicate findings to different audiences.
4. Develop proficiency in using statistical software for data manipulation, analysis, and visualization.
5. Design studies, evaluate literature, and collaborate in interdisciplinary teams, preparing for advanced study and research in biostatistics and related fields.

UNIT-I Descriptive methods **9 Hrs**

Frequency Distribution, Characteristics of a Frequency Distribution, Tabular and Graphical Presentation of Data: Line Graphs, Bar Charts, Histograms, Ogives.

UNIT-II Measures of central tendency **9 Hrs**

Arithmetic Mean, Median, Mode, Position of Averages, Selection of the Appropriate Measure of Central Tendency, Geometric Mean, Harmonic Mean.

UNIT-III Measures of dispersion **9 Hrs**

Range, Interquartile Range, Mean Deviation, Variance and Standard Deviation

UNIT-IV Sampling Designs **9 Hrs**

Sampling and Sample Designs, Significance of Probability and Non-probability sampling methods, Crossover Design, Case Control Design, Cohort Study Design, Designing clinical trials - Single- and Double-Blind Experiments.

UNIT-V Data analysis and interpretation **9 Hrs**

Tests of hypothesis, Tests of significance, chi-square test, Goodness of fit, Analysis of variance.

Course Outcomes:

1. Ability to design experiments, sampling variables, analyze the biological data, interpret and present the results in meaningful way.
2. Create tables and graphs for data presentation
3. Describe measures of central tendency and dispersion along with calculating probability features of experiments.
4. Discuss the correlation between various types of data along with associated variables.
5. Test hypothesis and carry out related statistical tests

Textbooks:

1. Daniel WW, Cross CL (2013) Biostatistics: A Foundation Sciences
2. Biostatistics: A Foundation for Analysis in the Health Sciences, 11th Edition Chad L. Cross, Wayne W. Daniel , ISBN: 978-1-119-49657-1, December 2018

Reference Books

1. Forthofer RN, Lee ES, Hernandez M (2006) To Design, Analysis, and Discovery. Elsevier Ltd., Amsterdam.
2. Principles of Biostatistics, 3rd Edition, By Marcello Pagano, Kimberlee Gauvreau, Heather Mattie (2022).

1st YEAR: I SEMESTER
UNIVERSITY ELECTIVE - I

TAUT1201C	**CONSTITUTION OF INDIA**	**L T P C**
		3 0 0 3

Course Description:

The Constitution of India course provides a comprehensive understanding of the fundamental principles, structure, and functioning of the Indian Constitution. This course examines the historical evolution, key features, and various interpretations of the Constitution, highlighting its significance in shaping India's legal and political landscape. Through this course, students will gain insights into the roles and responsibilities of different branches of government, fundamental rights and duties of citizens, and the constitutional mechanisms that ensure the democratic functioning of the nation.

Course Objectives:

1. To realize the significance of constitution of India to students from all walks of life and help them to understand the basic concepts of Indian constitution.
2. To identify the importance of fundamental rights as well as fundamental duties.
3. To understand the functioning of Union, State and Local Governments in Indian federal system.
4. To learn procedure and effects of emergency, composition and activities of election commission and amendment procedure.
5. To acquire knowledge to appear for competitive examinations.

UNIT-I **9 Hrs**

Historical Background – Constituent Assembly of India – Philosophical Foundations of The Indian Constitution – Preamble – Constitutional amendments

UNIT-II **9 Hrs**

Fundamental Rights – Directive Principles of State Policy – Fundamental Duties – Citizenship – Constitutional Remedies for Citizens.

UNIT-III **9 Hrs**

Union Government – Structures of the Union Government and Functions – President – Vice President – Prime Minister – Cabinet – Parliament – Supreme Court of India – Judicial Review.

UNIT-IV **9 Hrs**

State Government – Structure and Functions – Governor – Chief Minister – Cabinet – State Legislature – Judicial System in States – High Courts and other Subordinate Courts.

UNIT-V **9 Hrs**

Statutory Institutions – Elections - Election Commission of India, National Human Rights Commission, National Commission for Women; Local Self Government; Lok pal.

Course Outcomes:

At the end of the course the student should be able to:

1. Understand and explain the significance of Indian Constitution as the fundamental law of the land.
2. Exercise his fundamental rights in proper sense at the same time identifies his responsibilities in national building.
3. Analyse the Indian political system, the powers and functions of the Union, State and Local Governments in detail
4. Understand Electoral Process, Emergency provisions and Amendment procedure.
5. Take part in competitive examinations with confidence.

Textbooks:

1. Durga Das Basu, "Introduction to the Constitution of India ", Prentice Hall of India, New Delhi.
2. R.C.Agarwal, (1997) "Indian Political System", S.Chand and Company, New Delhi.

Reference Books:

1. Sharma, Brij Kishore, "Introduction to the Constitution of India", Prentice Hall of India, New Delhi.
2. The Constitution of India (2022) : https://cdnbbsr.s3waas.gov.in/s380537a945c7aaa788ccfcdf1b99b5d8f/uploads/2023/05/2023050195.pdf
3. Refer the website through the link given for Constitution of India in various Indian Languages https://legislative.gov.in/constitution-of-india/
4. Indian Constitution at Work by National Council of Educational Research and Training, Sri Aurobindo Marg, New Delhi

1st YEAR: I SEMESTER
UNIVERSITY ELECTIVE - I

TAUT1201D	**ETHICAL HACKING**	**L T P C**
		3 0 0 3

Course Description:

This course is about to learn ethical hacking and security challenges in computer networking. Which addresses the data security issues and types of attacks includes malwares, viruses, sniffer and denial of service. It teaches ethical responsibilities, professional integrity and making appropriate use of the tools and techniques.

Course Objectives:

The objective of this course is to make students to:

1. Know the concepts of hacking, ports and penetration testing
2. Understand the foot printing types and techniques of scanning
3. Understand the process of system hacking, trojans and backdoors
4. Apply the concepts of sniffing, packet analysis & session Hijacking
5. Learn the ethical issues and responsibilities associated with ethical hacking

UNIT-I **9 Hrs**

Introduction to Hacking: Hacking, Types and phases of hacking. Introduction to Ports & Protocols: Ports, Protocols, Primary Network Types. Introduction to Penetration Testing: Penetration test, Categories and Types of Penetration tests, Structure of Penetration Test Report.

UNIT-II **9 Hrs**

Foot printing: Foot printing, Types, Using ping and ns Lookup commands in Windows command line. Scanning: Scanning, Basics of Scanning, Basic Techniques of Scanning, Enumerating DNS using dns enum, Performing flag scan using hping3.

UNIT-III **10 Hrs**

Issues Hacking into System: System Hacking, Password Cracking, Default password databases, Manual and Automated Password Cracking, Process of System Hacking, Using Keyloggers. Trojans & Backdoors: Trojans, Working of Trojan, Infection Techniques, Attack, Lifecycle and Classification of Virus, Worms, Virus Construction Kit.

UNIT-IV **9 Hrs**

Types, Sniffing, Packet Analysis & Session Hijacking: Sniffing, Packet Analysis, Types of Sniffing, Active and Passive Sniffing Techniques, Session Hijacking. Cryptography: Cryptography, Digital Signature, Hash Functions.

UNIT-V **8 Hrs**

An introduction to the particular legal, professional and ethical issues likely to face the domain of ethical hacking. Ethical responsibilities, professional integrity and making appropriate use of the tools and techniques associated with ethical hacking.

Course Outcomes:

At the end of the course, student will be able to

1. Explain the concepts related to hacking, ports and protocols, penetration testing
2. Determine the applicable foot printing techniques and scanning methods
3. Explain the process of system hacking and explain the concepts Trojans, backdoors, worms and virus and its countermeasures
4. Demonstrate systematic understanding of the concepts of sniffing and cryptography
5. Understand the legal and professional responsibilities of ethical hacking

Textbooks:

1. Jiawei Hacking: Be a Hacker with Ethics, Harsh Bothra, Khanna Publications, 2019.
2. Ethical Hacking and Penetration Testing Guide, Rafay Baloch, 2014.

Reference Books:

1. Alex Berson Kali Linux Wireless Penetration Testing Beginner's Guide, Vivek Ramachandran, Cameron Buchanan, Packt Publishing, 2015.
2. SQL Injection Attacks and Defense, 1st Edition, Justin Clarke-Salt, Syngress Publication.
3. Mastering Modern Web Penetration Testing, Prakhar Prasad, Packt Publishing, October 2016.

1st YEAR: I SEMESTER
UNIVERSITY ELECTIVE - I

TAUT1201E	**FUNDAMENTALS OF COMPUTERS**	**L T P C**
		3 0 0 3

Course Description:
The course is designed to aim at imparting a basic level appreciation program. The incumbent can use the computer for basic purposes of preparing his personnel/business letters, viewing information on the Internet (the web), sending mail, using internet banking services, etc. and allows to become digitally literate.

Course Objectives:
The objective of this course is to make students to:

1. To introduce the fundamental concepts of computers, including their characteristics, types, and applications.
2. To explain the functional components of a computer and various input/output devices.
3. To understand different types of computer memory and storage devices.
4. To introduce computer languages and software, including algorithms and programming languages and provide an overview of operating systems and basic networking concepts.
5. To introduce the components and practical applications of MS Office.

UNIT-I **9 Hrs**

Introduction to Computer: Computer Characteristics, Concept of Hardware, Software, Evolution of computer and Generations, Types of Computers–Analog and Digital computers, Hybrid Computers, General Purpose and Special Purpose Computers, Limitations of Applications of Computer in Various Fields.

UNIT-II **9 Hrs**

Structure and Working of Computer: Functional Block Diagram of Computer. CPU, ALU, Memory UNIT-, Bus Structure of Digital Computer–Address, Data and Control Bus.

Input/Output Devices: Input Device– Keyboard, Mouse, Scanner, MICR,OMR. Output Devices–VDU, Printers– Dot Matrix, Daisywheel, Inkjet, Laser, Line Printers and Plotters.

UNIT-III **9 Hrs**

Computer Memory: Memory Concept, Memory Cell, Memory Organization, Semiconductor Memory – RAM, ROM, PROM, EPROM, Secondary Storage Devices – Magnetic Tape, Magnetic Disk (Floppy Disk and Hard Disk.), Compact Disk.

Computer Language and Software: Algorithm, Flowcharts, Machine Language, Assembly Language, High Level Language, Assembler, Compiler, Interpreter. Characteristics of Good Language. Software – System and Application Software.

UNIT-IV **9 Hrs**

Operating System: Operating System, Evolution of Operating System. Functions of Operating System. Types of Operating Systems. Detailed Study of Windows Operating System. Introduction and Features of LINUXOS.

Networking: Concept, Basic Elements of a Communication System, Data Transmission Media, Topologies, LAN, MAN, WAN, Internet

UNIT-V **9 Hrs**

MSOffice: Introduction to MS Office, Components and Features. MSWord: Creating Letter, Table, Fonts, Page Layout Document, Formatting, Spell Check, Print Preview, Template, Color, Mail Merge, AutoText, Inserting Picture, WordArt.

MS Excel: Introduction to Excel, Sorting, Queries, Graphs, Scientific Functions.

PowerPoint: Introduction to PowerPoint, Creation of Slides, Inserting Pictures, Preparing Slide Show with Animation. MS Access: Creation and Manipulation of Files.

Course Outcomes:

Upon completion of the course, student will be able to:

1. Understand the basic characteristics, types, and applications of computers.
2. Comprehend the functional components and input/output devices of a computer.
3. Describe various memory types and secondary storage devices.
4. Differentiate between machine, assembly, and high-level languages and their associated tools.
5. Understand the role and types of operating systems, with knowledge of Windows and Linux, and basic networking concepts. Utilize MS Word, Excel, PowerPoint, and Access for practical applications.

Textbooks:

1. Peter Norton: Computing Fundamentals.6th Edition, Mc Graw Hill-Osborne, 2007.
2. Sarita Dhawale, Thakur Akash Ashok: Fundamentals of Computer, Thakur Publication Pvt. Ltd.

Reference Books:

1. Deborah Morley and Charles S.Parker; Fundamentals of Computers; Cengage Learning, India edition; 2009.
2. Alex is Leon and Mathews Leon; Fundamentals of Information Technology; Vikas Publication, Chennai.
3. Francis Scheid; Theory and Problems of Introduction to Computer Science Schaum's Outline Series; Tata Mc Graw Hill publication.

1st YEAR: I SEMESTER
UNIVERSITY ELECTIVE - I

TAUT1201F GENDER AND DEVELOPMENT L T P C
3 0 0 3

Course Description:
The course is important for professionals from the point of creating engendered perspectives and sensitivity toward issues concerning women, men, and sexual minorities. It further reaffirms the belief in the importance of grassroots experiences and narratives while dealing with gender issues.

Course Objectives:
1. Understand key concepts, and issues in gender and development
2. Understand the social construction of gender and develop gender perspectives in analysing social realities
3. Understand how the gender dynamics of power and inequality play out in the social institutions of households, markets, and states and within the arena of civil society.
4. Create awareness about the magnitude of gender disparities in the present context
5. Examine through the gender lens, the interlinkage between cultural practices social processes, and development approaches

UNIT-I Basic Concepts and Theories of Feminism 10 Hrs
Concepts- gender, gender studies, gender identity, gender role stereotyping, gender division of labor, gender discrimination, gender equality, and equity. Overview of feminist theories – Liberal feminism, Radical Feminism, Black feminism, postmodern feminism, Eco- feminism; The international background to the Women's Movement, The genesis of the Women's Movement in India. Contemporary Contestations – Intersex and Transgender Movements. • Feminist thinkers in the 18th, 19th, 20th, and 21st Centuries.

UNIT-II Gender Issues 10 Hrs
Major gender issues – national and global - causes and consequences., LGBTQIA+ issues (Gender violence in private and public spaces: Domestic violence, Dowry, trafficking in women and children, rape, sex-selective abortion, female infanticide, female foeticide, child marriage, prostitution • Gender, leadership, and workplace; Sexual Harassment at Workplace). Gender-based violence, patriarchy, sexism, racism, casteism, economic inequality, and misogyny. Gender and health (Physical and mental), reproductive health, and sexuality. Feminization of poverty. Issues of the rights of sexual minorities and transgender - Article 377 and beyond.

UNIT-III Gender Perspectives in Development 10 Hrs
Gender Analysis Tools: Gender budgeting, Gender mainstreaming, SIG, Gender Parity Index, Gender Inequality Index, Human Development Index, Gender Development Index, Gender Empowerment Measure, Approaches to development-- Women in Development (WID), Women and Development (WAD), Gender and Development(GAD), Millennium

Development Goals, and Sustainable Development Gender Analysis Frameworks; Gender blind; neutral and redistributive policies; Welfare, Efficiency and Empowerment approaches to Gender; Strategic and practical gender needs/interests; Case Studies to understand the engagement with gender, (Poverty alleviation Forestry; Drinking Water and Sanitation; Health programmes, Urban renewal and slum rehabilitation Programmes, and micro-credit programmes like SHGs.

UNIT-IV Mechanisms Addressing Issues and Best Practices 10 Hrs

Constitutional and legislative safeguards, policies, and programmes • Institutional mechanisms: National Commission for Women, Rashtriya Mahila Kosh, Crime Against Women Cell, Family Court, Family Counselling Centers and Crisis intervention centers • Best practices to address disparity, violence, and safety issues

International initiatives world conferences, women's decade, CEDAW. Indian initiatives – Towards Equality Report, National Perspective Plan for women, National Policy for the Empowerment of Women-2001, National and State women's Commissions, Nirbhaya, Women Development Corporation; Legal remedies and Social Welfare Services available to Women Facing Violence.

UNIT-V Gender and Media 5 Hrs

Discourse on Women and Media Studies- Mainstream Media, Feminist Media. • Coverage of Women's issues, sexual minorities, and issues of women in Mass Media and Media Organizations (Audio-Visual and Print media). • Digital Media and legal protection (cybercrimes and laws). • Alternative Media – Folk Art, Street Play and Theatre. • Indecent Representation of Women (Prohibition) Act, 1986, Pornography, Impact of media on Gender. Construction of masculinity and feminity in media.

Course Outcomes:

By the end of the course, students should be able to:

1. Understand the concept of gender and the social construction of feminity and masculinity
2. Develop sensitivity towards the existing practices leading to gender discrimination and marginalization in society.
3. Develop the ability to identify social, economic and political systems that adversely affect the well-being and functioning of women.
4. Suggest affirmative action in planning to promote gender equity, equality, and safety for women and sexual minorities
5. Understand the major theoretical and empirical issues that emerge in the gender field.

Text Books:

1. Nalini Visvanathan (Ed.), (2006) The Women, Gender and Development Reader, Zubaan, New Delhi
2. Kannabiran, Kalpana& Ritu Menon. 2007. From Mathura to Manorma: Resisting Violence Against Women, New Delhi: Women Unlimited

Reference Books:

1. Seth, M. 2001. Women and Development: The Indian Experience. New Delhi: Sage Publications.
2. Banerjee, N; S. Sen &N. Dhawan. 2011. Mapping the Field: Gender Relations in Contemporary India, Volume 1, Kolkata: Stree
3. Bose, C.E. &Minjeong Kim. 2009. Global Gender Research: Transnational Perspectives, New York: Routledge

Notes

1. https://www.studocu.com/row/document/kohat-university-of-science-and-technology/gender-studies/gender-studies-new-lecture-notes-1-7/5176872
2. https://teentalk.ca/learn-about/gender-identity/#:~:text=There%20are%20many%20different%20gender,or%20a%20combination%20of%20these.
3. https://genderspectrum.org/articles/understanding-gender

1st YEAR: I SEMESTER
UNIVERSITY ELECTIVE - I

TAUT1201G	**LEADERSHIP DEVELOPMENT**	**L T P C**
		3 0 0 3

Course Description:
This course provides a comprehensive introduction to the fundamental concepts of leadership. Students will gain knowledge of different leadership levels and styles and understand the significance of vision and strategy formulation.

Course Objectives:
1. Understand the basic concepts of leadership
2. Knowledge of leadership development strategy
3. Knowledge of leadership development approaches
4. Knowledge of leadership traits
5. Awareness on self-awareness exercises.

UNIT-I **9 Hrs**
Understanding Leadership - Defining Leadership; Leadership styles, Entrepreneurial leaders, Different levels of leaders

UNIT-II **9 Hrs**
Strategy formulation - formulation of vision, Strategy formulation and communication, role of the leader in managing change, foundation for effective team development

UNIT-III **9 Hrs**
Leadership development approaches - Significance of leadership development strategy, leadership development approaches - One-to-one coaching, Mentor schemes, Role of HR and development, Buddy pairs, Action learning sets, Work-based projects

UNIT-IV **9 Hrs**
Recognizing Leadership Traits - Historical Leaders; Traits Leaders Display, Leadership Studies: What Traits Do Effective Leaders Exhibit.

UNIT-V **9 Hrs**
Recognising self - Exercises of Self-awareness using Johari Window, Development diaries, Feedback exercises, Personal vision setting

Course Outcomes:
1. Understand the basic concepts of leadership
2. Understand the significance of vision and strategy formulation
3. Knowledge of leadership development approaches.
4. Knowledge of leadership traits.

5. Knowledge of self-awareness techniques

Textbooks:

1. Rosemary Ryan, Leadership Development - A guide for HR and Training professionals, ELSEVIER, UK
2. Kim S. Cameron, Positive Leadership: Strategies for Extraordinary Performance,

Reference Books:

1. Manuel London, Leadership Development: Paths To Self-insight and Professional Growth, Psychology Press, New York.
2. Susan E. Murphy, Ronald E. Riggio, The Future of Leadership Development, Routledge is an imprint of Taylor & Franci

1st YEAR: I SEMESTER
UNIVERSITY ELECTIVE - I

TAUT1201H **MATHEMATICAL THINKING** **L T P C**
3 0 0 3

Course Description:
Mathematical Thinking is a university elective course that teaches fundamental concepts of basic algebraic and mathematical operations. After learning this course, students will easily be able to learn more problems solving skills and use this course for practicing. The course emphasizes problem-solving skills and analytical thinking and equips students with the skills necessary to tackle real-world problems using basic mathematical and arithmetical concepts.

Course Outcomes:
At the end of this course, the students will be able:

1. To familiarize the students with the fundamental concepts of basic numbers, mathematical operations, and divisibility rules
2. Summarize the basic concepts mathematical operations on numbers and calculate LCM, GCD to solve simple problems.
3. Compute To probability concepts and statistical methods in various applications engineering.
4. Understand the formula for evaluate the square root and cube root of different types numbers
5. Impart the arrangements and selections of things and counting numbers and check for independence of events.

UNIT-I **9 Hrs**
Number system and Tests of Divisibility: Digits, numbers, Indian-Hindu-Arabic system, Roman Numbers, Face Value and Place values, Various Types of Numbers or Standard Numbers, Prime number, composite numbers, Perfect Numbers, Co-primes (or) Relative Primes, Twin primes, perfect numbers, Testing of prime numbers, Mathematical operations on even and odd numbers.

UNIT-II **9 Hrs**
LCM and GCD or HCF: Factors and Multiplers, Highest Common Factor (H.C.F.) or Greatest Common Measure (G.C.M.) or Greatest Common Divisor (G.C.D.) factorization method, division method, finding the H.C.F. of more than two numbers, factorization method of finding L.C.M, H.C.F. and L.C.M. of fractions.

UNIT-III **9 Hrs**
System Simplifications: BODMAS' Rule, Modulus of a Real Number, Virnaculum (or Bar), Algebraic identities, set theory operations (union, intersection, complements).

UNIT-IV **9 Hrs**

Square Roots, Cube Roots, averages and percentages: Square Root, cube root, Problems on numbers, concept of averages, problems on averages, concept of percentage and problems on percentages.

UNIT-V **9 Hrs**

Permutations, combinations and Probability: Fundamental principle with respect of addition and multiplication, permutations, combination, relation between permutation and combination, Random experiment, sample space and basic problems of events of a probability.

Course Outcomes:

At the end of the course, student will be able to:

1. To explain fundamental concepts of basic number system, including standard numbers, mathematical operations, and divisibility rules.
2. To apply mathematical operations on numbers and calculate lcm, gcd to solve simple problems.
3. To evaluate the arrangements and selections of things and counting numbers.
4. To understand the simplications by using identities and apply the different kinds of operations on the numbers.
5. To evaluate square root and cube root of different types numbers and calculate appropriate solutions for different problems.

Text Books:

1. Quantitative Aptitude Text Book, Dr.RS.Agrrwal.
2. Quantitative Aptitude, Text Book,S.Chandu.
3. Andhra Pradesh Academy of IPE text books.

Reference Books:

1. Quantitative Aptitude, Text Book, Quicker Mathematics ,second edition
2. Quantitative Aptitude, Text Book,Abjuirh guwaha,Fourth edition
3. www.online quantitative aptitude testseries.com
4. Quantitative Aptitude, GSR Publications,Gunturu,third edition
5. Quantitative Aptitude, verbal reasoning ,Guptha publication,3rd edition
6. www.enaduprathibaonline.com and www.sakshionlineseries.com

1st YEAR: I SEMESTER
UNIVERSITY ELECTIVE - I

TAUT1201I **NURSING** **L T P C**
3 0 0 3

Course Description:
This module is designed to help the students to acquire comprehensive knowledge in basic concepts of Health, Nursing, Vital signs, Basic Life support, home care management of Diabetes & Hypertension and Adolescent health.

Course Objectives:
Students undergoing this course are expected to:

1. Understand the concept of health, illness, and Nursing
2. Learn the technique of assessing and monitoring vital signs
3. Perform BLS using evidence based national or international guidelines in the management of adult victims with the cardiac arrest.
4. Understand the concept of home care management of Diabetes and Hypertensive persons
5. Develop understanding about the normal growth and development, needs and health issues of adolescents

UNIT-I **3 Hrs**
Concepts of Health and Nursing: Definition of Health and ill ness, Health-illness continuum, Factors influencing Health, Nursing as a profession and Career ladder.

UNIT-II **12 Hrs**
Vital signs:
Temperature: Physiology, regulation, factors affecting body temperature, Assessment of body temperature: sites, technique and special considerations.
Pulse: Physiology & regulation, characteristics of the pulse, factors affecting pulse, Assessment of the pulse: sites, location, technique and special considerations.
Respiration: Physiology and regulation, mechanics of breathing, characteristics of the respiration, factors affecting respiration, Assessment of respiration: technique and special considerations.
Blood pressure: Physiology and regulation, characteristics of the blood pressure, factors affecting blood pressure. Assessment of blood pressure: sites, equipment and technique and special considerations. Recording of vital signs.
Pain: Definition, types of physiology of pain and factors influencing the pain

UNIT-III **8 Hrs**
Basic life support / basic cardiopulmonary life support (BLS/BCLS)
Introduction, definition, purposes, indications, contraindications and steps in procedure.

UNIT-IV **12 Hrs**

Home care management of Diabetes and Hypertension

Diabetes - Introduction to Diabetes Mellitus – A National and Global burden: Classification, risk factors, pathophysiology, manifestations, screening, diagnostic criteria and complications, The treatment Modalities of Diabetes Mellitus: (Lifestyle modifications Diet therapy, Exercise, Medical Management, Self-Management, Practical Aspects: Blood Glucose monitoring, Diabetic foot care, Exercises, Diabetic Diet Planning, Self-Insulin administration)

Hypertension - Introduction to Hypertension, Types, risk factors, pathophysiology, manifestations, diagnostic criteria and complications, treatment modalities: lifestyle modifications, Diet therapy, Exercise, Medical management.

UNIT-V **10 Hrs**

Adolescent Health: Growth and Development of adolescent, Nutritional and developmental needs of adolescent, Common health problems including mental health problems, Reproductive and sexual health issues

Course Outcomes:

At the end of this course, students should be able to:

1. Acquire a thorough knowledge on concept of health and illness.
2. Demonstrate skills in monitoring the vital signs
3. Develop skills in performing BLS/BCLS
4. Able to attain knowledge and skills on treatment modalities of DM
5. Aware of normal Growth and development and common health problems in adolescent

Textbooks:

1. Potter and perrys, Fundamentals of Nursing,4th edition, Mosby, Elsevier publication
2. Lewis, textbook of Medical Surgical Nursing 4th south Asian edition, Elsevier publication
3. Dorothy R. Marlow, Textbook of paediatric nursing, sixth edition, Elsevier publications,

Reference Books:

1. Joyce M black textbook of medical surgical nursing ,8th edition, Elsevier publications,
2. Kozier and Erbs, textbook of fundamentals of Nursing, Elsevier publications.

1st YEAR: I SEMESTER
UNIVERSITY ELECTIVE - I

TAUT1201J	**ONE HEALTH**	**L T P C**
		3 0 0 3

Course Description:

This course introduces students to the One Health approach, an interdisciplinary approach that recognizes the interconnectedness of human, animal and environmental health. Students will learn about the history of One Health, its relevance to global health and its role in addressing a range of health challenges, including zoonotic diseases, environmental health hazards and antimicrobial resistance. The course will also explore current and emerging One Health challenges and innovations and the ethical considerations of One Health research and practice.

Course Objectives:

1. To explain the relevance of One Health to global health.
2. To understand the interdisciplinary nature of One Health research and practice.
3. To analyze the impact of environmental health hazards on human and animal health.
4. To identify emerging One Health challenges and innovations.
5. To evaluate ethical considerations in One Health research and practice.

UNIT-I **9 Hrs**

Overview of One Health and its relevance to global health, Definition of One Health and its history, Examples of One Health challenges, such as zoonotic diseases and antimicrobial resistance, The role of inter-disciplinarity in One Health research and practice, Global One Health initiatives and their impact

UNIT-II **9 Hrs**

Environmental health and its relationship to One Health, Overview of environmental health and its impact on human and animal health, Environmental risks to health, such as pollution and climate change, Case studies highlighting the impact of environmental hazards on human and animal health, The role of One Health in addressing environmental health challenges

UNIT-III **9 Hrs**

Zoonotic diseases and One Health, Overview of zoonotic diseases and their impact on human and animal health, The ecology of zoonotic diseases and how they emerge and spread, Case studies of major zoonotic disease outbreaks, such as Ebola and COVID-19, The One Health approach to preventing and controlling zoonotic diseases.

UNIT-IV **9 Hrs**

Antimicrobial resistance and One Health, Overview of antimicrobial resistance and its impact on human and animal health, the relationship between antimicrobial use in animal agriculture and human health, the role of One Health in addressing the global challenge of antimicrobial resistance, Case studies of One Health approaches to controlling antimicrobial resistance, such as the WHO Global Action Plan

UNIT-V **9 Hrs**

Future directions in One Health research and practice, Emerging One Health challenges-food security and emerging infectious diseases, Innovations in One Health research and practice, such as digital technologies and genomics, Opportunities for One Health collaboration across sectors and disciplines, Ethical considerations in One Health research and practice.

Course Outcomes:

By the end of the course, students will be able to:

1. Describe the One Health approach and its relevance to global health
2. Analyse the impact of environmental health hazards on human and animal health
3. Evaluate the role of One Health in addressing zoonotic diseases and controlling antimicrobial resistance
4. Identify emerging One Health challenges and innovations
5. Discuss ethical considerations in One Health research and practice

Textbooks:

1. One Health: People, Animals and the Environment by Ronald M. Atlas and Stanley Maloy
2. One Health: The Human-Animal-Environment Interfaces in Emerging Infectious Diseases by John S. Mackenzie and Martyn Jeggo

Reference Books:

1. One Health: The Theory and Practice of Integrated Health Approaches edited by Jakob Zinsstag, Esther Schelling, David Waltner-Toews and Maxine Whittaker
2. One Health and the Politics of Antimicrobial Resistance edited by Laura H. Kahn, Bruce Kaplan and Thomas P. Monath
3. The One Health Initiative: A Global Movement to Achieve Sustainable Health and Well-being edited by Bruce Kaplan and Thomas P. Monath.

1st YEAR: I SEMESTER
UNIVERSITY ELECTIVE - I

TAUT1201K BASIC EMERGENCY CARE AND LIFE SUPPORT SKILLS L T P C
3 0 0 3

Course Description:
This course introduces students to the fundamental skills required for providing basic emergency care and life support. It covers essential techniques in CPR, AED use, and basic first aid to prepare students for real-life emergency situations.

Course Objectives:
Students undergoing this course are expected to:

1. To understand the principles and techniques of basic life support.
2. To acquire essential first aid skills.
3. To know the use of AED
4. To get trained in the practical aspects of CPR.
5. To know the various assessment aspects of a patient in an emergency

UNIT-I Basic Life Support (BLS) and CPR **9 Hrs**
Introduction to BLS and CPR, Steps of Adult, Child, and Infant CPR, Airway Management, Rescue Breathing and Chest Compressions

UNIT-II Automated External Defibrillator (AED) **9 Hrs**
What is an AED? When and How to Use an AED, Safety Precautions, Different types of Defibrillators

UNIT-III Basic First Aid Techniques **9 Hrs**
Principles of First Aid, Managing Bleeding and Wounds, Fractures and Sprains, Burns and Scalds.

UNIT-IV Recognizing Medical Emergencies **9 Hrs**
Identifying Common Medical Emergencies, Initial Assessment and Response, Managing Breathing and Cardiac Emergencies.

UNIT-V Practical Skills Practice **9 Hrs**
Hands-on CPR Practice, AED Operation Drills, First Aid Skills Practice, Scenario-Based Training

Course Outcomes:
At the end of this course, students should be able to:

1. Acquire a thorough knowledge of the principles and techniques of basic life support.
2. Apply essential first aid skills.
3. Demonstrate the use of AED in Emergencies.
4. Demonstrate the practical aspects of CPR
5. Evaluate various assessment plans by the specific emergency.

Textbooks:

1. "Basic Life Support Provider Manual" by American Heart Association Pang, Ning Tan, Michael Steinbach and Vipin Kumar “Introduction to Data Mining”, Pearson Education, 2007.
2. "First Aid Manual" by St. John Ambulance

1st YEAR: I SEMESTER
UNIVERSITY ELECTIVE - I

TAUT1201L BASICS OF HEALTH MANAGEMENT L T P C
3 0 0 3

Course Description:
This course provides an essential foundation in health management, focusing on key areas such as basic life support, first aid, stroke management, and the prevention and management of both communicable and non-communicable diseases. Students will develop practical skills and knowledge to effectively manage health-related situations in various settings.

Course Objectives:
Students undergoing this course are expected to:

1. To understand the principles and techniques of basic life support.
2. To acquire essential first aid skills.
3. To comprehend the causes, symptoms, and management of stroke.
4. To learn about non-communicable diseases, their risk factors, and management strategies.
5. To understand communicable diseases, their transmission, prevention, and control.

UNIT-I Basic Life Support 9 Hrs
Overview of Basic Life Support (BLS), Cardiopulmonary Resuscitation (CPR) Techniques, Use of Automated External Defibrillators (AEDs), Airway Management and Breathing Support, BLS Protocols and Procedures

UNIT-II First Aid 9 Hrs
Introduction to First Aid Principles, Managing Wounds and Bleeding, Fractures and Musculoskeletal Injuries, Burns and Scalds Treatment, Handling Medical Emergencies (e.g., heart attack, choking, seizures)

UNIT-III Stroke 9 Hrs
Understanding Stroke: Types and Causes, Symptoms and Warning Signs of Stroke, Immediate Response and Management, Stroke Rehabilitation and Recovery, Prevention and Risk Reduction Strategies

UNIT-IV Non-Communicable Diseases 9 Hrs
Definition and Classification of Non-Communicable Diseases (NCDs), Common NCDs: Cardiovascular Diseases, Diabetes, Cancer, Chronic Respiratory Diseases, Risk Factors and Prevention Strategies, Management and Treatment Approaches, Public Health Implications and Policy Responses

UNIT-V Communicable Diseases 9 Hrs
Introduction to Communicable Diseases, Modes of Transmission and Epidemiology, Prevention and Control Measures (e.g., vaccination, hygiene, quarantine), Management of

Common Communicable Diseases (e.g., TB, HIV/AIDS, Influenza), Emerging Infectious Diseases and Global Health Security

Course Outcomes:

At the end of this course, students should be able to:

1. Perform basic life support techniques.
2. Administer essential first aid.
3. Recognize and manage stroke symptoms and treatments.
4. Understand and address non-communicable diseases.
5. Implement communicable disease control measures.

Textbooks:

1. "Basic Life Support Provider Manual" by American Heart Association
2. "First Aid Manual" by St. John Ambulance, St. Andrew's First Aid, and the British Red Cross

Reference Books:

1. "Stroke: Practical Guide to Management" by Charles P. Warlow
2. "Non-Communicable Diseases in the Developing World" by Rachel Nugent
3. "Communicable Disease Control and Health Protection Handbook" by Jeremy Hawker et al.

1st YEAR: I SEMESTER
UNIVERSITY ELECTIVE - I

TAUT1201N	**ENTREPRENEURSHIP**	**L T P C**
		3 0 0 3

Course Description:

This course provides an in-depth understanding of entrepreneurship, its applications, and its scope. Students will learn to generate broad ideas for starting an enterprise or startup and convert them into viable opportunities. The course covers the essentials of managing startups, understanding small and medium enterprises, and gaining knowledge of various financial institutions.

Course Objectives:

1. Understand the concept of Entrepreneurship, its applications and scope.
2. Application of knowledge for generating a broad idea for a starting an enterprise/start up and converting to opportunity.
3. Knowledge of managing the start-up's
4. Understand the small and medium enterprises
5. Knowledge of different financial institutions

UNIT-I **9 Hrs**

Entrepreneurship: Definition and Concept of entrepreneurship - Entrepreneur Characteristics – Classification of Entrepreneurs –Role of Entrepreneurship in Economic Development

UNIT-II **9 Hrs**

Idea to Opportunity - Introduction, Sources of New Ideas, Techniques for Generating Ideas, Assessing Business Potential of an Idea, Opportunity Recognition, Sources and process, Indian Economy—Opportunities, Steps Involved in Tapping Opportunity

UNIT-III **9 Hrs**

Entrepreneurship Development - Intrapreneurship, Entrepreneurship as a Career Option, Female Entrepreneurship and problems, Types of Start-ups, Start-ups and mistakes, Managing Start-ups During Downturn

UNIT-IV **9 Hrs**

Entrepreneurship Trends - Small and Medium Business Enterprises, International Entrepreneurship, Entrepreneurship—Emerging Trends in the Global Knowledge Economy

UNIT-V **9 Hrs**

Institutions Supporting and Taxation Benefits: Central level Institutions: NABARD; SIDBI,– State Level Institutions –DICs – SFC - Government Policy for MSMEs - Tax Incentives and Concessions.

Course Outcomes:

1. Basic understanding of entrepreneurship
2. Knowledge of idea generation and opportunities identification of entrepreneurship
3. Understand different forms of enterprises
4. Understand different emerging trends of entrepreneurship
5. Knowledge of different financial institutions

Textbooks:

1. Arya Kumar, Entrepreneurship, Pearson, Delhi
2. Poornima MCH, Entrepreneurship Development –Small Business Enterprises, Pearson, Delhi

Reference Books:

1. Anil Kumar, S., ET.al., Entrepreneurship Development, New Age International Publishers, New Delhi
2. Khanka, SS, Entrepreneurship Development, S. Chand, New Delhi
3. Peter F. Drucker,Innovation and Entrepreneurship
4. A.Sahay, M. S. Chhikara, New Vistas of Entrepreneurship: Challenges &Opportunities

1st YEAR: I SEMESTER
UNIVERSITY ELECTIVE - I

TAUT1201O	**MANAGERIAL ECONOMICS**	**L T P C**
		3 0 0 3

Course Description:

This course provides a solid foundation in the fundamentals of economics and managerial economics. Students will learn to apply concepts of production cost and revenues for effective business decisions. The course also covers analyzing capital investments to maximize returns, understanding different forms of business organizations, and evaluating business organizations and marketing strategies.

Course Objectives:

1. Understand the fundamentals of Economics and Managerial economics
2. Apply the Concept of Production cost and revenues for effective Business decision
3. Analyze how to invest their capital and maximize returns.
4. Understand different forms of business organizations
5. Evaluate Business organizations and marketing strategies

UNIT-I **9 Hrs**

Introduction: Meaning, Nature, Significance, Functions, and Advantages, ME and its role in other fields. Demand - Concept, Function, Law of Demand - Demand Elasticity- Types – Measurement. Demand Forecasting- Factors governing forecasting and methods.

UNIT-II **9 Hrs**

Production: Introduction – Nature, meaning, significance, functions and advantages. Production Function– Least- cost combination– Short run and Long run Production Function- Isoquants and Isocosts, MRTS - Cobb-Douglas Production Function - Laws of Returns

UNIT-III **9 Hrs**

Cost & Break-Even Analysis - Cost concepts and Cost behavior- Break-Even Analysis (BEA) - Determination of Break-Even Point (Simple Problems)-Managerial significance and limitations of Break-Even Analysis.

UNIT-IV **9 Hrs**

Business Organizations Introduction – Nature, meaning, significance, functions and advantages. Forms of Business Organizations- Sole Proprietary - Partnership - Joint Stock Companies - Public Sector Enterprises.

UNIT-V **9 Hrs**

Markets: Types of Markets - Perfect and Imperfect Competition - Features of Perfect Competition Monopoly- Monopolistic Competition–Oligopoly-Price-Output Determination - Pricing Methods and Strategies.

Course Outcomes:

1. Basic understanding of managerial economics
2. Develop an understanding of the applications of production
3. Interpret cost analysis
4. Understand different forms of business organizations.
5. Analyse the causes and consequences of different market conditions.

Text Books:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2013.
2. Aryasri: Business Economics and Financial Analysis, 4/e, MGH, 2019.

Reference Books:

1. Ahuja Hl Managerial economics Schand,3/e,2013
2. S.A. Siddiqui and A.S. Siddiqui: Managerial Economics and Financial Analysis, New Age International, 2013.
3. Joseph G. Nellis and David Parker: Principles of Business Economics, Pearson, 2/e, New Delhi.

1st YEAR: I SEMESTER
UNIVERSITY ELECTIVE - I

TAUT1201P **ORGANIC FARMING** **L T P C**
3 0 0 3

Course Description:

By the end of the course, students will be equipped with the knowledge and skills to plan, establish, and manage organic farms effectively. This course serves as a foundation for aspiring organic farmers, agricultural professionals, and individuals interested in sustainable food production and environmental conservation.

Course Objectives:

1. To Understand the principles and practices of organic farming.
2. To Analyze the environmental, economic, and social implications of conventional versus organic agricultural systems.
3. To Apply organic farming techniques to enhance soil health and fertility.
4. To Examine the certification processes and regulations governing organic farming.
5. To explore ways to engage with local communities and promote organic practices.

UNIT-I **9 Hrs**

Introduction to Organic Farming, Overview of organic farming principles and practices, Historical development and evolution of organic agriculture, Importance of organic farming in sustainable agriculture, Comparison between conventional and organic farming systems, Certification and regulatory requirements for organic farming.

UNIT-II **9 Hrs**

Soil Health and Management, Importance of soil health in organic farming, Soil composition and structure, Soil fertility management without synthetic inputs, Soil conservation techniques: cover cropping, crop rotation, mulching, Composting and vermicomposting for organic matter enrichment.

UNIT-III **9 Hrs**

Crop Management in Organic Systems, Selection of suitable crops for organic farming, Organic seed selection, saving, and sourcing, Crop planning and rotation strategies, Weed management without herbicides: mechanical, cultural, and biological control methods, Pest and disease management in organic systems: integrated pest management (IPM), biological control, and natural remedies.

UNIT-IV **9 Hrs**

Organic Livestock Management, Principles of organic livestock production, Organic feed sourcing and formulation, Housing and space requirements for organic livestock, Health care and disease management without antibiotics and synthetic chemicals, Organic certification requirements for livestock operations.

UNIT-V **9 Hrs**

Marketing and Economics of Organic Farming, Market trends and consumer demand for organic products, Certification and labeling requirements for organic products, Marketing strategies for organic farmers: direct sales, farmers markets, CSA (Community Supported Agriculture), Economic viability and profitability of organic farming, Government support programs and incentives for organic farmers.

Course Outcomes:

Upon completion of the course the student shall be able to,

1. Demonstrate a comprehensive understanding of the principles of organic farming and their application in agricultural systems.
2. Critically evaluate the sustainability of different agricultural practices, considering environmental impact, economic viability, and social equity.
3. Design and implement an organic farming plan for a specific crop or agricultural enterprise.
4. Analyze case studies and research articles to assess the effectiveness of organic farming practices in various contexts.
5. Communicate effectively about organic farming principles and practices, both orally and in writing.

Text Books:

1. "Teaming with Microbes: The Organic Gardener's Guide to the Soil Food Web" by Jeff Lowenfels and Wayne Lewis
2. "The Organic Farmer's Business Handbook: A Complete Guide to Managing Finances, Crops, and Staff - and Making a Profit" by Richard Wiswall

Reference Books:

1. "Introduction to Permaculture" by Bill Mollison
2. "Crop Rotation on Organic Farms: A Planning Manual" by Charles L. Mohler and Sue Ellen Johnson
3. "The Organic Farming Manual: A Comprehensive Guide to Starting and Running a Certified Organic Farm" by Anne Larkin Hansen

1st YEAR: I SEMESTER
UNIVERSITY ELECTIVE - I

TAUT1201Q	**PERSONALITY DEVELOPMENT**	**L T P C**
		3 0 0 3

Course Description:

Personality Development is a comprehensive course designed to equip undergraduates with the essential skills and knowledge required for personal growth and professional success. The course focuses on enhancing self-awareness, emotional intelligence, communication, and interpersonal skills. Students will learn how to build confidence, manage stress, and develop effective time management strategies. Additionally, the course covers critical aspects of professional development, including resume writing, interview techniques, and personal branding.

Course Objectives:

1. To develop self-awareness and emotional intelligence.
2. To enhance communication and interpersonal skills.
3. To build confidence and self-esteem.
4. To foster professional and personal growth.
5. To prepare students for successful careers and meaningful personal lives.

UNIT-I Introduction to Personality Development **9 Hrs**

Definition and importance of personality development; Initial self-assessment and goal setting; Short-term and long-term goal setting; Understanding oneself: strengths, weaknesses, opportunities, threats (SWOT analysis); Values, beliefs, and attitudes; Personal vision and mission statements; Components of emotional intelligence (EQ); Self-regulation and self-motivation; Empathy and social skills.

UNIT-II Communication Skills and Interpersonal Skills **9 Hrs**

Communication Skills; Verbal and non-verbal communication; Active listening and feedback; Public speaking and presentation skills; Building and maintaining relationships; Conflict resolution and negotiation; Teamwork and collaboration; Importance of cultural sensitivity in a globalized world; Developing intercultural communication skills

UNIT-III Critical Thinking, Problem Solving and Self-Esteem **9 Hrs**

Enhancing analytical and critical thinking skills; Creative problem-solving techniques Decision-making process; Confidence and Self-Esteem; Building self-confidence; Overcoming self-doubt and negative thinking; Techniques for boosting self-esteem.

UNIT-IV Time Management and Stress Management **7 Hrs**

Prioritization and productivity techniques; Overcoming procrastination; Identifying sources of stress; Techniques for managing and reducing stress; Work-life balance.

UNIT-V Professional Development and Leadership Skills **11 Hrs**

Resume writing and job interview skills; Professional etiquette and workplace behavior Networking skills; Traits of effective leaders; Leadership styles and theories; Developing leadership qualities; Personal Branding, Building a personal brand; Online presence and social media etiquette; Personal branding strategies; Final self-assessment and reflection on personal growth

Course Outcomes:

By the end of this course, students will be able to:

1. Develop a personal vision and mission statement to guide future actions and decisions.
2. Exhibit improved verbal and non-verbal communication skills.
3. Apply strategies to boost self-confidence and maintain high self-esteem.
4. Implement effective time management techniques to enhance productivity.
5. Develop and demonstrate leadership qualities in various scenarios.

Text Books:

1. Student's Hand Book- Skill Genie-Higher Education Department, Govt. Of Andhra Pradesh -https://svimstpt.ap.nic.in/edu/skill_genie.pdf.
2. The only skill that matters- Jonathan.Levi (2019)- Super Human Enterprises, LLC. All rights reserved. ISBN:978-1-5445-0435-3

Reference Books:

1. Online courses and TED Talks on personality development and self-improvement.
2. "How to Win Friends and Influence People" by Dale Carnegie (1936) Revised- 2022.

1st YEAR: I SEMESTER
UNIVERSITY ELECTIVE - I

TAUT1201R	**SOCIAL ENTREPRENEURSHIP**	**L T P C**
		3 0 0 3

Course Description:

This course explores the role of social entrepreneurship in societies, economies, and politics. Students will learn about the three pillars of social entrepreneurship and the different types of partners and their advantages. The course also covers the typical process steps of creating a marketing concept and describes the characteristics of the financing structure of social enterprises.

Course Objectives:

1. Understand the role of social entrepreneurship in societies, economies and politics
2. Explain the three pillars of social entrepreneurship.
3. Describe different types of partners for social entrepreneurs and their particular advantages.
4. Understand the typical process steps of a marketing conception.
5. Describe the characteristics of the financing structure of social enterprises.

UNIT-I **9 Hrs**

Introduction - Meaning of social entrepreneurship- concepts and typologies, its disparity with social business and CSR, social entrepreneur & personality, social enterprise.

UNIT-II **9 Hrs**

Drivers and scope: Role of Social Entrepreneurship in -Societies, Economies and Politics, The Drivers of Social Entrepreneurship, Size and Scope of Social Entrepreneurship, Opportunities for Social Entrepreneurs.

UNIT-III **9 Hrs**

Collaboration and Partnerships - Reasons for Crafting Collaborations, Specific Types of Collaborations, Different Collaboration Partners, Potential Risks and Challenges, Guidelines to Establish a Collaboration.

UNIT-IV **9 Hrs**

Elements of a Marketing Conception - Market analysis, Marketing Goals, Competitive Strategy, Measures, Controlling; Peculiarities Concerning Marketing for Social Enterprises, Marketing Importance for Social Enterprises.

UNIT-V **9 Hrs**

Finance - Types of Financing Instruments- Donations, Equity capital, Debt capital, Hybrid capital; Financing institutions-value banks, social investment advisors, social stock exchange, Venture Philanthropy Funds, Social Investment Funds, Funding Consultancies

Course Outcomes:

1. Knowledge of social entrepreneurship differentiation from other related concepts
2. Understand the role of social entrepreneurship in societies, economies and politics
3. Analysis of different types of partners for social entrepreneurs.
4. Understand the typical process steps of a marketing conception.
5. Awareness of the peculiarities of financial elements in social enterprises

Textbooks:

1. Christine K. Volkmann & Kim Oliver Tokarski. 2012.Social Entrepreneurship and Social Business. Springer Gabler
2. Madhukar Shukla: Social Entrepreneurship in India. Sage publications

Reference Books:

1. Archana Singh (auth.) The Process of Social Value Creation: A Multiple-Case Study on Social Entrepreneurship in India. Springer India.2016.
2. Ryszard Praszkier; Andrzej Nowak. Social entrepreneurship : theory and practice [1 ed.]. Cambridge University Press
3. Alex Nicholls. Social Entrepreneurship: New Models of Sustainable Social Change. Oxford University Press, USA

2nd Semester						
Course Code	Course Name	Periods per week			Credits	Hours per week
		L	T	P		
AHSJ1304	Microbiology	3	1	2	5	5
AHSJ1305	Pathology	3	1	2	5	5
AHSJ1306	Pharmacology	3	1	2	5	5
TAUT1102	University Core - II	3	0	0	3	3
TAUT1202	University Elective II	3	0	0	3	3
RDTT1501	Programme Core	3	0	0	3	3
--	Mentoring	0	0	0	0	1
--	Co-curricular activity	0	0	0	0	2
--	Self-Learning	0	0	0	0	2
--	Physical Activity	0	0	2	0	3
--	Extra-curricular activities	0	0	2	0	2
--	Library	0	1	0	0	2
	TOTAL	**18**	**4**	**6**	**24**	**36**

University Elective - II	
S. No	**Name of the Course**
Indian Languages	
1	Telugu
2	Tamil
3	Hindi
4	Professional English
Foreign Languages	
5	French
6	German
7	Spanish
8	Japanese

1st YEAR: II SEMESTER

AHSJ1304	MICROBIOLOGY	L	T	P	C
		3	1	2	5

Course Description:

This course will cover on general properties of pathogenic bacteria, viruses, fungi and parasites along with immune mechanisms, its response, methods of sterilization and disinfection, healthcare associated infections and hospital infection control practices. It helps the student to understand the natural history of infectious diseases to deal with etiology, pathogenesis, clinical features, laboratory diagnosis, treatment and control of infections in the community including immunoprophylaxis.

Course Objectives:

Students undergoing the course shall be expected to:

- Learn the general properties, structure and physiological aspects of bacteria and identification of bacteria.
- Learn about infection, immunity, various antigen-antibody reactions, immune mechanisms and hypersensitivity reactions and various infection control practices.
- Learn about pathogenesis, laboratory diagnosis and prophylactic measures of various bacterial infections.
- Learn about general properties of viruses and fungi and morphology, pathogenesis, laboratory diagnosis and prophylactic measures of various viral and fungal infections.
- Learn about classification of parasites and their morphological forms, life cycle, pathogenesis, laboratory diagnosis and prophylactic measures of various parasitic infections.

THEORY **Total: 60 Hrs**

UNIT-I **10 Hrs**

INTRODUCTION TO MEDICAL MICROBIOLOGY

- Importance of Medical Microbiology
- Historical aspects

GENERAL PROPERTIES & PHYSIOLOGICAL ASPECTS OF BACTERIA

- Structure of bacteria and its appendages like capsule, flagella, pili and spore
- Classification based on morphology, arrangement and motility
- Microscopy & Staining techniques
- Bacterial Growth Curve, Nutritional requirements of bacteria

BACTERIAL IDENTIFICATION METHODS

- Culture media, Culture Methods
- Specimen collection and transport to the laboratory
- Laboratory methods of Identification of Bacteria
- Antibiotic Sensitivity testing – Diffusion and Dilution methods

UNIT-II **12 Hrs**

INFECTION CONTROL PRACTICES

Infection – Definition, types and sources of infection, mode of transmission, types of infectious diseases, microbial pathogenicity

- Sterilization, Disinfection and Asepsis
- Standard Safety Precautions
- Biomedical Waste Management
- Hospital acquired infections, mode of spread, types and predisposing factors, investigation and surveillance

IMMUNOLOGY

Immunity – Definitions, terminology, Innate, acquired and herd immunity

- Antigen & Antibody
- Antigen-Antibody Reactions – Precipitation reactions, Agglutination reactions, ELISA, IFA
- Immune response
- Hypersensitivity - Definition and Classification and Type I, II, III, IV types of hypersensitivity
- Immunoprophylaxis – Immunization schedule, vaccines, storage & handling, hazards of immunization

UNIT-III **16 Hrs**

PATHOGENIC BACTERIA– Morphology, pathogenicity, laboratory diagnosis and prophylaxis of the following organisms

- **Gram Positive Cocci:** Staphylococci, Streptococci & Pneumococci
- **Gram Negative Cocci:** Meningococci, Gonococci
- **Gram Positive Bacilli:** Corynebacterium diphtheriae, Clostridium perfringens, Clostridium tetani, Clostridium botulinum, Bacillus anthracis, Bacillus cereus
- **Gram Negative Bacilli:** Escherichia coli, Klebsiella, Proteus, Salmonella, Shigella, Vibrio, Bordetella, Hemophilus
- **Acid Fast bacilli:** Mycobacterium tuberculosis, Mycobacterium leprae
- **Spirochaetes:** Treponema, Borrelia, Leptospira
- Rickettsiae

UNIT-IV **12 Hrs**

GENERAL VIROLOGY

- **General Properties of Viruses** – Structure, viral multiplication, viral cultivation, classification, inclusion bodies, antiviral agents
- Specimen collection and transport of viral disease samples to laboratory

PATHOGENIC VIRUSES – Morphology, Pathogenicity, laboratory diagnosis and prophylaxis of the following organisms

- RNA Viruses – Polio virus, influenza virus, mumps virus, measles virus, rubella virus, rabies virus, dengue virus, chickungunya virus, Japanese encephalitis virus,

- DNA Viruses – Herpes simplex virus, Varicella zoster virus, Epstein Barr virus, Variola, Molluscum contagiosum, Adeno virus, Human Papilloma virus
- Viral Hepatitis – Hepatitis A, B, C, D and E
- Rota Virus
- SARS Virus, Corona virus
- Human Immunodeficiency Virus (HIV)

PATHOGENIC FUNGI – Morphology, pathogenicity, laboratory diagnosis and prophylaxis of the following organisms

- Introduction, classification of fungi and fungal diseases, antifungal agents
- Superficial mycoses, subcutaneous mycoses, systemic mycoses and opportunistic mycoses
- Mycetism and mycotoxicosis

UNIT-V **10 Hrs**

PARASITOLOGY – Mode of infection, pathogenicity, clinical picture, laboratory diagnosis of the following parasites

0. **Protozoans:**Entamoeba histolytica, Trichomonas vaginalis, Leishmania donovani, Plasmodium spp., Toxoplasma gondii, Pneumocystis jirovecii, Cryptosporidium parvum
1. **Cestodes:**Taeniasolium, Taenia saginata, Diphylobothrium latum
2. **Trematodes:**Schistosoma haematobium, Fasciola hepatica, Fasciolposis buskii, Clonrchis sinensis, Paragonimuswestermanii
3. **Nematodes:**Ascaris lumbricoides, Ankylostoma duodenale, Enterobius vermicularis, Strongyloidesstercoralis, Wucherariabancrofti

Course Outcomes:

At the end of the course student should be able to:

- Describe the General Properties and physiological aspects of Bacteria, Culture media, culture methods and identification of Bacteria.
- Explain about immunity, antigen, antibody and various antigen-antibody reactions, immune mechanisms and hypersensitivity reactions along sterilization & disinfections methods and various infection control practices.
- Describe the morphology, pathogenesis, laboratory diagnosis and prophylactic measures of various bacterial infections.
- Describe the General Properties of Viruses and Fungi and morphology, pathogenesis, laboratory diagnosis and prophylactic measures of various viral and fungal infections.
- Classify the parasites and describe the morphological forms, life cycle, pathogenesis, laboratory diagnosis and prophylactic measures of various parasitic infections.

PRACTICALS **Total: 30 Hrs**

Students undergoing the course shall be able to:

- Perform commonly employed bed-side tests for detection of infectious agents such as blood film for malaria, filariasis, gram staining, AFB staining, serology and stool sample for ova and cyst.
- Use the correct method of collection, storage and transport of clinical material for microbiological investigations

The assessment of the students will be done with the help of following exercises:

- Spotters
- Performing Gram stain, Acid-fast staining
- Stool Examination

Textbooks:

1. The Short Textbook of Medical Microbiology (including Parasitology): Satish Gupte
2. Medical Parasitology: C P Baveja & V Baveja
3. Ananthanarayan and Paniker's Textbook of Microbiology for Nurses

Reference Books:

1. Ananthanarayan and Paniker's Text book of Microbiology-12th Edition
2. Apurba Sastry,S; Bhat,S; Essentials of Medical Microbiology –4th Edition
3. Baveja. C.P; Text book of Microbiology – 7th Edition
4. Paniker's Text book of Medical Parasitology – 9th Edition

1st YEAR: II SEMESTER

AHSJ1305	PATHOLOGY	L	T	P	C
		3	1	2	5

Course Description:

Pathology is a vast expanding and ever-changing subject and it's the key to understanding diseases worldwide. The allied health sciences are an endeavour to present this vast subject understandably to the learners.

The aim of Teaching/learning Pathology at AHS is to provide knowledge/insight into etiology, pathogenesis, and pathophysiology &diseases.

Course Objectives:

- Describe the normal structure of a cell functions& its probable disease version. (cell in health disease)
- Cellular responses to injury& Adaptations, reversible irreversible injuries
- Inflammation & repair sequence of events happening during this.
- Infections, hemodynamic, Immunopathology, neoplasia, nutritional genetic disorder in disease conditions
- Systemic pathology ... Starting from the Heart, blood vessels, hematopathology.
- System-wise diseases discussion respiratory, GIT, hepatobiliary, urinary, MGT, FGT, Breast, Bones & joints, endocrines, Diabetes, skin, CNS & eye.
- Experiencing the practice of Clinical Pathology Starting with anticoagulants, HB estimation, blood, cell counts, hematocrit, PBS, ESR, RC, BM, examination, CSF, Semen analysis, urine &other body fluids.
- make the student understand the overall subject matter.

THEORY **Total: 60 Hrs**

UNIT-I **12 Hrs**

General Pathology -General pathology provides an overview of the basic pathologic mechanisms underlying diseases including cellular adaptations, inflammation, tissue repair, Chronic inflammation, hemodynamic disorders, immunological disorders, neoplasia, genetics and effects of radiation.

UNIT-II **12 Hrs**

Systemic Pathology 1 -Deals with various organ systems like vascular, Cardiac, LN, Respiratory system, head and neck, GIT, liver & hepatobiliary system.

UNIT-III **12 Hrs**

Systemic Pathology 2- pancreas, Urinary, Male genital system, female genital system, breast, bones, joints, soft tissue tumors, endocrines, Diabetes, Skin, CNS, peripheral nerves &Skeletal system.

UNIT-IV **12 Hrs**

Haemato pathology -Disorders of RBCs, WBCs, Platelets, anaemias, leukaemias, disorders of hemostasis, coagulation disorders, plasma cell disorders& blood

UNIT-V **12 Hrs**

Clinical pathology – deals with anticoagulants, Hb estimation blood cell counts, hematocrit, ESR, Reticulocyte count, BM examination, semen analysis, CSF and other body fluids analysis, urine examination

Course outcome:

At the end of the course, the student can able to expand/ learn

- Define& practice of Pathology
- Haematological consequences of the disease process
- Can able to expand the Pathogenesis, pathophysiology, clinical consequences of disease process, complications

PRACTICALS **Total: 30 Hrs**

(Only theoretical lectures as there is no provision of technicians, or logistics provided for practicals for AHS students).

Hb estimation, RBC count, WBC count, platelet count, PBS, ESR, PCV, fluids, Urine examination.

Assessment of the student will be:

- Assignments
- Midterm examinations
- Workbook

References

- A well-illustrated textbook is available for AHS students – Text of pathology for AHS students – DR. Ramdas Nayak
- Robbins &cotran text book of pathology
- Harsh mohan text book of pathology
- Anderson's text book of pathology
- Bancroft text book of histological techniques

1st YEAR: II SEMESTER

AHSJ1306	**PHARMACOLOGY**	**L**	**T**	**P**	**C**
		3	**1**	**2**	**5**

Course Description:

This course will cover general pharmacology with special emphasis on common drugs used, drug nomenclature, their routes of drug administration, dosage formulations, dose and frequency of administration.

This course also covers side effects, toxicity, management of their toxicity and drug interactions.

Course Objectives:

Students undergoing this course are expected to:

- Describe the general principles of drug action, handling of drugs by the body and drugs acting on ANS & autacoid system.
- Explain the mechanism of action, therapeutic uses and adverse effects of drugs used in common CNS disorders.
- Explain the mechanism of action, therapeutic uses and adverse effects of drugs used in common cardiovascular diseases and haematological disorders.
- Explain the mechanism of action, therapeutic uses and adverse effects drugs used in common endocrine, respiratory and gastrointestinal disorders.
- Enlist drugs used in common infections, cancers and immunological disorders and explain their mechanism of action.

THEORY **Total: 60 Hrs**

UNIT-I **12 Hrs**

General Pharmacology: Introduction, Definitions, Sources of Drugs, Drug nomenclature – Routes of administration & Pharmacokinetics – Pharmacodynamics – Factors modifying drug action – Adverse Drug Effects & Pharmacovigilance.

Drugs Acting on Autonomic Nervous System: Cholinergic Drugs –Anticholinergic Drugs – Adrenergic Drugs – Antiadrenergic Drugs

Autacoids and Related Drugs: Histamine and Antihistaminics –Prostaglandins, Leukotrienes (Eicosanoids) and Platelet Activating Factor – Nonsteroidal Anti-inflammatory Drugs (Antipyretic-Analgesics).

UNIT-II **9 Hrs**

Drugs Acting on Central Nervous System: General Anaesthetics –Local anaesthetics– Sedative & Hypnotics – Antiepileptic Drugs – Antiparkinsonian Drugs – Antipsychotic and mood stabilizers – Antidepressant and Antianxiety Drugs – Opioid Analgesics and Antagonists – Skeletal muscle relaxants.

UNIT-III **11 Hrs**

Cardiovascular Drugs: Drugs Affecting Renin-Angiotensin System & CCBs –Diuretics – Cardiac Glycosides and Drugs for Heart Failure – Antianginal Drugs –Antihypertensive Drugs – Antiarrhythmic Drugs – Hypolipidemic Drugs

Drugs Affecting Blood and Blood Formation: Haematinics and Erythropoietin – Coagulants & Anticoagulants – Antiplatelet drugs & Fibrinolytics – IV fluids, Plasma expanders & Drugs for shock.

UNIT-IV **10 Hrs**

Hormones and Related Drugs: Introduction, Thyroid Hormone and Thyroid Inhibitors – Insulin, Oral Hypoglycaemic Drugs and Glucagon – Corticosteroids– Sex hormones & Hormonal Contraceptives –Drugs Affecting Calcium Balance – Tocolytics & Ecbolics.

Respiratory System Drugs: Drugs for Cough – Drugs for Bronchial Asthma

Gastrointestinal Drugs: Drugs for Peptic Ulcer and Gastroesophageal Reflux Disease – Antiemetic & Prokinetic drugs – Drugs for Constipation and Diarrhoea

UNIT-V **18 Hrs**

Antimicrobial Drugs: Beta-Lactam Antibiotics- Penicillins – Cephalosporins, Monobactams & Carbapenems – Sulfonamides, Cotrimoxazole and Quinolones – Tetracyclines and Macrolides –Aminoglycosides and Misc. Antibacterial Antibiotics – Antitubercular Drugs & Antileprotic Drugs –Antifungal Drugs – Antiviral Drugs (Non- retroviral) – Antiviral Drugs (Anti - retroviral) – Antimalarial Drugs – Antiamoebic and Other Antiprotozoal Drugs – Anthelmintic Drugs

Chemotherapy of Neoplastic Diseases: Anticancer Drugs

Miscellaneous Drugs: Immunosuppressant Drugs – Drugs Acting on Skin and Mucous Membranes – Antiseptics and Disinfectants – Ocular Pharmacology

Course Outcomes:

At the end of this course, students should be able to:

- Apply the pharmacokinetic and pharmacodynamics principles that describe drug actions.
- Explain the rationale for selection of suitable drugs used in various CNS disorders.
- Explain the rationale for selection of suitable drugs used in various cardiovascular and haematological disorders.
- Explain the rationale for selection of suitable drugs used in various endocrine, respiratory and gastrointestinal disorders.
- Explain the rationale for selection of suitable drugs used in common infections, cancers and immunological disorders.

PRACTICALS **Total: 30 Hrs**

Course Objective: The course will cover general pharmacology with special emphasis on route of administration, type of formulations, dose and frequency of administration, importance of manufacturing and expiry dates, storage instructions of each drug, calculation of drug doses and general principles in the management of poisoning.

The assessment of the students will be done with the help of following exercises.

- Spotters
- Dosage calculations
- Dosage formulations

Textbooks:

1. Textbook of Pharmacology for Dental & Allied Health Sciences – Padmaja Uday Kumar- 5th edition- 2023.
2. Fundamentals of Pharmacology for Allied Health Science- Dr Pradnya Deolekar- 3rd edition- 2019.
3. Textbook of Pharmacology for Allied Sciences- Kamalakannan - 3rd edition- 2019.

Reference Books:

1. Essentials of Medical Pharmacology - K.D. Tripathi- 8th edition Reprint-2023.
2. Basic & Clinical Pharmacology. Katzung BG (Ed), Publisher: Prentice Hall International Ltd., London- 15th Edition-2021.

1st YEAR: II SEMESTER
UNIVERSITY CORE - II

TAUT1102 ENVIRONMENTAL STUDIES L T P C
3 0 0 3

Course Description:
This course provides degree-seeking students with an array of opportunities to learn, practice and motivate communities on environmental importance. It further helps to understand the resources, optimize the recourses in future days, and address the gaps in the eco system.

Course Objectives:
Students undergoing this course are expected to:

1. Understand eco system and scope of multidisciplinary
2. Creating the awareness about environmental problems among people.
3. Imparting basic knowledge about the environment and its allied problems.
4. Developing an attitude of concern for the environment.
5. Understand the developments in global goals

Unit-I **8 Hrs**

Multidisciplinary nature of environmental studies; Definition, scope and importance; Need for public awareness; **Natural Resources:** Renewable and non-renewable resources; Forest resources: Water resources: Mineral resources; Food resources: Energy resources: Land resources; Equitable use of resources for sustainable lifestyles; Natural resources and associated problems.

Unit-II **8 Hrs**

Ecosystems: Concept of an ecosystem.; Introduction, types, characteristic features, structure and function of the following ecosystem: - Forest ecosystem; Grassland ecosystem; Desert ecosystem; Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries); Environment Protection Act,1986; Public awareness.; Environment and human health.

Unit-III **8 Hrs**

Biodiversity and its conservation: Introduction – Definition- genetic, species and ecosystem diversity.; Biogeographical classification of India; India as a mega-diversity nation; Hot-sports of biodiversity.; Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts.; Endangered and endemic species of India; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Unit- IV **8 Hrs**

Environmental Pollution Definition; Cause, effects and control measures of Air pollution; Water pollution; Soil pollution; Marine pollution; Noise pollution; Thermal pollution and nuclear hazards - Solid waste Management: Causes, effects and control measures of urban and industrial wastes. - Role of an individual in prevention of pollution - Disaster management: floods, earthquake, cyclone and landslides.

Unit-V **8 Hrs**

Social Issues and the Environment: From Unsustainable to Sustainable development; Water conservation- rainwater harvesting- watershed management; Resettlement and rehabilitation of people; its problems and concerns.; Environmental ethics: Issues and possible solutions.; Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust - Wasteland reclamation.; Consumerism and waste products.; Population and environment.

Field work **5 Hrs**

Field visits to nearby; awareness campaign; special lectures by experts; quiz, debate competitions, short film Contest, rally etc

Course Outcomes:

At the end of this course, students should be able to:

1. Understand key concepts from economic, political, and social analysis as they pertain to the design and evaluation of environmental policies and institutions.
2. Appreciate concepts and methods from ecological and physical sciences and their application in environmental problem solving.
3. Appreciate the ethical, cross-cultural, and historical context of environmental issues and the links between human and natural systems.
4. Reflect critically about their roles and identities as citizens, consumers and environmental activists
5. Be part in Development goals and educating the communities.

Textbooks:

1. Textbook of Environmental Studies (English, Paperback, Asthana D. K.) S.Chand & co , New Delhi
2. Textbook of Environmental Studies for Undergraduate Courses, Erach B Haruchu, UGC, KINDLE Edition, Amazon.

Reference Book:

1. Encyclopedia of Environment and Society- set of 5 volumes, Sage Publications

1st YEAR: II SEMESTER
UNIVERSITY ELECTIVE – II

TAUT1202C	**HINDI**	**L T P C**
		3 0 0 3

Course Description:
बच्चों में हिन्दी पढ़ने, लिखने की क्षमता बढ़ाना । आपस में अपनी भावनाओं को प्रकट करने की क्षमता बढ़ाना मुख्य उद्देश्य है।

Course Objectives:
1. संज्ञा, संज्ञा के प्रकार,सर्वनाम, सर्वनाम के प्रकार, क्रिया, क्रिया के प्रकार, क्रर्शेषण, क्रर्शेषण के प्रकार
2. लिंग, वचन, काल, वाच्य, अर्थ, विलोम शब्द, शब्दों का वाक्य में प्रयोग
3. हिंदी सीखने की आर्श्यकता बताते हुए छोटी बहन के नाम पर पत्र।, विहार यात्रा का वर्णन करते हुए अपने ममत्र के नाम पत्र।, शूल्क भरने के लिए पैसे भेजने अपने क्रपता के नाम पत्र।
4. कफन - प्रेमचंद, वापसी - उषा प्रियम्वदा यशपाल – परदा
5. यरकान्त त्रिपाठी निराला - जूही की कली,महादेवी वर्मा - मैं नीर भरी दुख की बदली, सुममत्रानंदन पंत - भारत माता

UNIT-I **9 Hrs**

1. संज्ञा, संज्ञा के प्रकार
2. सर्वनाम, सर्वनाम के प्रकार
3. क्रिया, क्रिया के प्रकार
4. विशेषण, विशेषण के प्रकार

UNIT-II **9 Hrs**

1. लिंग,वचन, काल,कारक
2. अर्थ, विलोम शब्द
3. शब्दों का वाक्य में प्रयोग

UNIT-III (पत्र लेखन) **9 Hrs**

1. हिंदी सीखने की आवश्यकता बताते हुए छोटी बहन के नाम पर पत्र।
2. विहार यात्रा का वर्णन करते हुए अपने मित्र के नाम पत्र।
3. शूल्क भरने के लिए पैसे भेजने अपने पिता के नाम पत्र।

UNIT-IV (कहानी और कहानीकार) **9 Hrs**

1. कफन - प्रेमचंद
2. वापसी - उषा प्रियम्वदा
3. यशपाल – परदा

UNIT-V (कवि और कविता) **9 Hrs**

1. सूर्यकांत त्रिपाठी निराला - जूही की काली
2. महादेवी वर्मा - मैं नीर भरी दुख की बदली
3. सुमित्रानंदन पंत - भारत माता

Course Outcomes:

1. बच्चों में पढने का क्षमता बढाना
2. लिखने की क्षमता बढाना
3. बोलने की क्षमता बढाना
4. भाषा के प्रक्रत रुलच उत्पन्न कराना
5. दैनंददन जीर्न में भाषा का प्रयोग करना

Textbooks:

1. हिन्दी व्याकरण
2. विश्वनाथ तिवारी की हिंदी कविता
3. प्रेमचंद की कहानियां

Reference Books:

विविधि प्रकार के कहानी और व्याकरण के किताबें संदर्भ ग्रंथ सूची

1. हिन्दी व्याकरण -कांता रानी मंजूषा,हरदेव बिहारी
2. विश्वनाद प्रसाद तिवारी - हिंदी कविता
3. विश्वनाद प्रसाद तिवारी- आधुनिक हिंदी कविता
4. पुष्पपाल सिंह - समकालीन हिंदी कविता

1st YEAR: II SEMESTER
UNIVERSITY ELECTIVE – II

TAUT1202D **PROFESSIONAL ENGLISH** **L T P C**
3 0 0 3

Course Description:
This course aims to enhance the English language proficiency of engineering students in professional contexts. Through a combination of theoretical knowledge and practical exercises, students will develop their skills in technical writing, oral communication, presentation, and critical thinking. The course will focus on various aspects of professional communication, including report writing, academic writing, technical presentations, and effective communication in interdisciplinary teams. Additionally, students will engage with real-world engineering scenarios to apply language skills in practical contexts.

Course Objectives:
Students undergoing this course are expected to:

1. Develop proficiency in technical writing for engineering reports, research proposals, and documentation.
2. Enhance oral communication skills for effective presentations, meetings, and discussions and thereby improve their employability skills.
3. Improve critical thinking and analytical skills through the evaluation of technical information and arguments.
4. Foster teamwork, collaboration skills in interdisciplinary engineering projects.
5. Develop awareness of cultural and linguistic diversity in professional settings.

UNIT-I **9 Hrs**

Pronunciation: Course techniques include recordings, partner work, group activities and one-on-one instructor feedback. Your speech will become clearer, more fluent and easier to understand. You'll improve your enunciation of individual sounds, intonation, stress patterns, pace and pausing.

UNIT-II **9 Hrs**

Speaking Professionally: You'll build greater confidence through individual work, group interaction and feedback from your peers and instructor. To express yourself more clearly and concisely, whether you are speaking in impromptu situations or making well-planned Presentations. Focus on language that familiarizes you with the use of English in everyday situations and contexts.

UNIT-III **9 Hrs**

Refine Your Grammar: Express yourself more accurately and eloquently by improving your English Grammar. You'll get the strong foundation you need to write and speak more clearly, precisely and persuasively. You'll explore the relationship between words in sentences, and analyse structure and meaning, clarify common problem points and improve punctuation. You'll have the opportunity to practice with your peers and get helpful feedback. You'll also learn what resources are best for ongoing grammar help. You'll apply them to produce

effective, concise written work with newfound confidence. You'll express yourself more clearly and persuasively by using varied, well-structured sentences and placing content more strategically. You'll also develop editing skills to rid your work of errors.

UNIT-IV **9 Hrs**

Writing Essentials – Professional Writing

Improve your written English for personal, professional and academic purposes. You'll refine your sentence structure, punctuation and verb tenses, and eliminate the most common errors that confuse readers. You'll enhance your writing style. Develop editing skills that help you revise your work. Lectures, discussions, e-learning tools and assignments will help you develop the communication skills you'll need in today's business environment.

UNIT-V **9 Hrs**

You'll be equipped to create power packed Power Point Presentations. Be in better stead to introducing yourself. To know the nuances that goes into the presenting of information, and articulating information. Know how to make an impressive introduction. To imbibe Life Skills that is necessary to lead a fruitful and a fulfilling life.

Course Outcomes:

At the end of the course the student will be able:

1. To understand the importance of Professional English in workplace and learn the correct pronunciation and delivery of speech.
2. To read technical proposals properly and make them to write good technical reports.
3. To achieve better comprehending skills, vocabulary and professional speaking skills.
4. To learn and identify the Common Errors in Writing and Speaking.
5. Acquire digital competence, employment and workplace communication skills.

Textbooks:

1. Technical Communication: Process and Product by Sharon J. Gerson and Steven M. Gerson
2. Engineering Communication: From Principles to Practice by David Ingre, C. O'Brien
3. Technical Writing Basics: A Guide to Style and Form by Brian R. Holloway

Reference Books:

1. The Encyclopaedia Britannica" - A comprehensive general encyclopaedia covering a wide range of topics.
2. The Oxford English Dictionary (OED)" - A comprehensive dictionary of the English language.

1st YEAR: II SEMESTER
UNIVERSITY ELECTIVE – II

TAUT1202A **FRENCH** **L T P C**
3 0 0 3

Course Description:

This course introduces students to French by intensively studying important aspects of pronunciation, vocabulary, grammar and sentence formation through practice sets and audio-visual lessons. It introduces the workings and sounds of the language and provides the necessary tools to enable students to make sentences from scratch.

Course Objectives:

1. To train the students to know about France, French culture and basics
2. To teach them to learn basic grammar and vocabulary.
3. To train them to learn tenses in French
4. To train them to talk about their daily routine
5. To train them to converse in French in day-to-day scenarios

UNIT-I **9 Hrs**

Introduction to France and its regions - French alphabets and numbers, countries and nationality

Grammaire – Verbs – s'appeler, être, avoir, definite and indefinite articles
Communication – Greetings, Self Introduction

UNIT-II **9 Hrs**

Basic vocabulary, colours, months and days

Grammaire - Verbes - Conjugation : Present tense (ER, IR, RE ending verbs) – Adjective possesive Communication – Talk about family and friends, date, time etc.

UNIT-III **9 Hrs**

Hobbies, interests and daily routine

Grammaire – Irregular verbs – Releflexive verbs - Future proche
Communication – Talking about hobbies and interests

UNIT-IV **9 Hrs**

Vocabulary of places and transport

Grammaire – Pertinent verbs, adjective demonstrative, past tense, propositions
Communication – Narrating an incident or story

UNIT-V **9 Hrs**

Vocabulary of food, services, money

Grammaire – Negation, Verbs – acheter, manger, payer, articles partitifs. Communication – Accept and refuse an invitation, situation in a restaurant

Course Outcomes:

After the course, the students will be able to:

1. Acquire familiarity in the French alphabet & basic vocabulary
2. Listen and identify individual sounds of French
3. Use basic sounds and words while speaking
4. Read and understand simple advertisements, brochures and invitations
5. Understand and use basic grammar and appropriate vocabulary in completing language tasks

Textbooks:

1. Grammaire Progressive du Français, CLÉ International, 2010.
2. Saison 1, Marie-Noëlle Cocton et al, Didier, 2014.
3. Cosmopolite A1 - Nathalie Hirschsprung, Tony Tricot

Reference Books:

1. Préparation à l'examen du DELF A1 – Hachette
2. Réussir le DELF A1 – Bruno Girardeau

1st YEAR: II SEMESTER
UNIVERSITY ELECTIVE – II

TAUT1202B	**GERMAN**	**L T P C**
		3 0 0 3

Course Description: German Language Training

Course Objectives:

1. Importance of German Language in Global prospective
2. To develop Reading skills for Basic Level
3. German writing skills, particularly emails & short messages
4. To develop basic German Speaking skills in order to meet the General activities
5. Listening practise to understand German Accent of the Native German Speakers

UNIT-I **9 Hrs**

GUTEN TAG: Saying hello and goodbye, introducing oneself and others, talking about oneself and others, numbers 1-20, spelling words and names, talking about countries and languages, the alphabet, first verbs in present tense, how to ask questions, useful terms and expressions

UNIT-II **9 Hrs**

FRUENDE, KOLLEGEN UND ICH: Talking about hobbies, days of the week, numbers from 20 on up, months and seasons in the year, talking about work and job, definite article, personal pronouns, the verbs to have (haben) and to be (sein), plurals of nouns.

UNIT-III **9 Hrs**

IN DER STADT: Getting around a town and asking for the way, giving directions, indefinite articles, negation with kein, imperative forms.

UNIT-IV **9 Hrs**

GUTEN APPETIT!: Talking about food, planning a trip to the grocery store, food and meals and talking about it, verbs that require the accusative

UNIT-V **9 Hrs**

TAG FÜR TAG: Telling and understanding time, talking about one's family, possessive articles (mein, dein) and modal auxiliaries (müssen, können, wollen).

Course Outcomes:

1. Basic Reading skills
2. Basic Writing skills with basic Grammar
3. Speaking skills and to do advance German Course
4. Understanding basic German for Daily Communication
5. Awareness of European Union and opportunities in Europe

Textbooks:

1. A1-German Level- Netzwerk A1 Book- Prescribed by International Institute- Goethe Institute Delhi.

1st YEAR: II SEMESTER

RDT1501	**Programme Core**	**L**	**T**	**P**	**C**
	Fundamentals of Dialysis Technology	**3**	**0**	**0**	**3**

Course Description:

This course explores essential chemistry and physics concepts related to dialysis, the principles and types of hemodialysis and peritoneal dialysis, and critical renal science terminologies. It also addresses the management of uremic solutes and emphasizes professional boundaries in clinical practice for effective patient care.

Course Objective:

Students undergoing this course are expected to:

1. To know about various hemodialysis concentrates and peritoneal dialysis fluids.
2. To know about the principles of dialysis.
3. To know about the basic physics and chemistry behind the dialysis procedure.
4. To understand the key terminologies and components related to renal science.
5. To recognize and maintain professional boundaries in a clinical setting.

Unit 1 Introduction to Basic Chemistry Concepts in Dialysis 9hrs

- Concept of atom
- The elements with their chemical symbols found in dialysate
- Concept of atomic weight
- Concept of mole
- Charges on the dialysate elements
- Acetate and Bicarbonate Dialysate
- Blood electrolytes Vs Dialysate.
- Mixing ratios
- Concentrate Composition
- Concentrate Alterations

Unit 2 Dialysis Related Physics 9hrs

- Fluid dynamics
- Thermodynamics
- The Gas Laws
- Temperature measurements

Dialysis and electronics

- Electricity
- Conductivity
- Electric leakage
- Isolation transformers

- Electronic components

Unit 3 Haemodialysis & Peritoneal Dialysis 9hrs

- History of Dialysis
- Indications of Dialysis
- Contra indications of Dialysis
- Principles of HD
- Types of dialyzer
- History of PD
- Three-pore model of peritoneal membrane
- Distributed model
- Types of PD

Unit 4 Terminologies in renal science 9hrs

- Adsorption and separation techniques
- Components of Artificial kidney
- Medical abbreviations used in nephrology
- Terms in water purification
- Terms in kidney transplantation
- Prescription
- Weight and volume equivalence
- Terms in Geriatric care
- Formulas used in nephrology

Uremic solutes

- Name the types of uremic solutes
- List the molecular weights of different types of uremic solutes and their features
- Define uremia, azotemia, Polyuria, oliguria, anuria, uremic encephalopathy, hematuria, proteinuria
- Explain them with causes, clinical symptoms, complications, diagnosis, management/treatment

Unit 5 Professional Boundaries 9hrs

- Evaluation of the atmosphere
- Evaluate relationships/Boundaries
- Recognize the imbalance of power
- Recognize the risk
- Be respectful-Be respected
- Identify your role in unprofessional boundaries
- Misconduct
- Teamwork

Course learning outcomes: At the end of the course the students should be able

1. To know about the fundamentals of Dialysis therapy
2. To know about various hemodialysis concentrates and peritoneal dialysis fluid
3. To understand the basic principles behind dialysis therapy.
4. To understand the hydraulics of dialysis machines.
5. To know the basic physics and chemistry related to dialysis therapy.

Textbooks:

1. Handbook of Dialysis by John T. Daugirdas, Peter G. Blake, and Todd S. Ing
2. Principles and Practice of Dialysis by William L. Henrich
3. Clinical Dialysis by Allen R. Nissenson and Richard N. Fine
4. Comprehensive Clinical Nephrology by Richard J. Johnson, John Feehally, Jürgen Floege
5. The Essentials of Clinical Dialysis by Yong-Lim Kim

Reference Books:

1. Brenner and Rector's The Kidney by Glenn M. Chertow, Philip A. Marsden, Karl Skorecki, T. Alp Ikizler, and Maarten W. Taal
2. Dialysis Therapy by Allen R. Nissenson and Richard E. Fine
3. Manual of Clinical Dialysis by Suhail Ahmad
4. Replacement of Renal Function by Dialysis by J.F. Maher
5. Hemodialysis: Principles and Techniques by Claudio Ronco, Rinaldo Bellomo, John A. Kellum
6. Textbook of Peritoneal Dialysis by Ramesh Khanna and Raymond T. Krediet
7. Applied Chemistry for Nurses and Technicians by Jayashree Ghosh

3rd Semester						
Course Code	**Course Name**	**Periods per week**			**Credits**	**Hours per week**
		L	**T**	**P**		
RDTT2501	Anatomy and Physiology Related to Renal Dialysis Technology	3	1	0	4	4
RDTT2502	Pharmacology Related to Renal Dialysis Technology	3	1	0	4	4
RDTT2503	Concepts of Renal Diseases	3	1	0	4	4
RDTL2501	Clinical skills I	0	0	10	5	10
TAUT2101	University Core (Health and wellness)	3	0	0	3	3
TAUT2201	University elective – III	3	0	0	3	3
--	Seminar	0	0	0	0	1
--	Library	0	0	0	0	2
--	Extra-curricular activities	0	0	0	0	2
--	Mentoring	0	0	0	0	2
	Total	**15**	**3**	**10**	**23**	**35**

S. No	Name of the Course	Host Department
1	Community Engagement	School of Social Sciences
2	Clinical Nutrition	School of Health Sciences – BMS & GMB
3	Emotional Intelligence & Mental Health	School of Health Sciences – Psychology
4	Human Rights	School of Social Sciences
5	Industry 4.0	School of Technology – CSE
6	Medical Terminology	School of Health Sciences – BMS & GMB
7	Social Network Analysis	School of Health Sciences – PH
8	Antibiotic Resistance & Biomedical Waste Management	School of Health Sciences – AHS
9	Behaviour Change Communication	School of Health Sciences – PH
10	Disability Management	School of Health Sciences – Psychology
11	Disaster Management	School of Social Sciences
12	Human Values & Professional Ethics	School of Social Sciences
13	Infection Prevention & Control	School of Health Sciences – AHS
14	NSS & Youth Development	School of Social Sciences

2nd YEAR: III SEMESTER

		L	T	P	C
RDTT2501	**Anatomy and Physiology Related to Renal Dialysis Technology**				
	Paper 1	**3**	**1**	**0**	**4**

Course Description:

This course covers the anatomy and physiology of the excretory system, including the development, structure, and blood supply of the urinary system. It also explores vascular anatomy related to hemodialysis, body fluid compartments, renal physiology, and the kidney's roles in homeostasis, erythropoiesis, and bone formation.

Course Objective:

Students undergoing this course are expected to:

1. To understand the development and basic anatomy of the excretory system.
2. To learn about the vascular supply of the excretory system and HD-related vasculature.
3. To comprehend the physiology of body fluid compartments and renal hormones.
4. To study the renal physiology related to dialysis technology, including mechanisms of urine formation.
5. To know the functions of the excretory system, including haemostasis, acid-base balance, and the roles of the kidney in erythropoiesis and bone formation.

Unit 1 Gross Structures of Excretory System 12 hrs

- Development of Excretory system
- Basic anatomy of the urinary system – structural anatomy of kidney, bladder, ureter, urethra, prostate
- Histology of kidney
- Blood supply of kidney

Unit 2 Vascular supply of the excretory system and HD-related vasculature 12 hrs

- Anatomy of the vascular system
- Upper limb vessels – course, distribution, branches, origin & abnormalities
- Neck vessels – course, distribution, branches, origin & abnormalities
- Femoral vessels - course, distribution, branches, origin & abnormalities
- Anatomy of peritoneum in General

Unit 3 Physiology of Body Volume Compartments 12 hrs

- Fluid Compartments
- Hormones produced by kidney & physiologic alterations in pregnancy
- Physiological values – urea, creatinine, electrolytes, calcium, phosphorous, uric acid, magnesium, glucose 24 hours urinary indices – urea, creatinine electrolytes, calcium, magnesium

Unit 4 Renal Physiology Related to dialysis technology 12 hrs

- Physiology of renal circulation factors contributing & modifying renal circulation autoregulation
- Mechanism of urine formation
    - ❖ Glomerular filtration rate (GFR)
    - ❖ Tubular Secretion
    - ❖ Tubular Reabsorption
    - ❖ Acidification of the urine
- Renal Function Tests

Unit 5 Functions of the excretory system 12 hrs

- Haemostasias – coagulation cascade, coagulation factors, autoregulation, BT, CT, PT, PTT, thrombin time
- Acid-base balance – basic principles & common abnormalities like hypokalemia, hyponatremia, hyperkalemia, hypernatremia, hypocalcemia, hypercalcemia, ph., etc.
- Role of Kidney in erythropoiesis
- Role of Kidney in Bone formation

Course Learning Outcome: At the end of the course, students should be able.

1. Understand the basic structures of excretory systems.
2. Identify the vascular supply of the kidney.
3. Understand the physiology of body volume compartments.
4. Understand the renal physiology related to dialysis.
5. Understand the excretory function and homeostasis functions of the kidney.

Textbooks:

1. Medical Physiology by Walter F. Boron and Emile L. Boulpaep
2. Guyton and Hall Textbook of Medical Physiology by John E. Hall
3. Clinical Anatomy by Systems by Richard S. Snell
4. Color Atlas of Anatomy: A Photographic Study of the Human Body by Johannes W. Rohen, Chihiro Yokochi, Elke Lütjen-Drecoll
5. Histology: A Text and Atlas by Michael H. Ross and Wojciech Pawlina

Reference Books:

1. The Kidney by Brenner and Rector
2. Nephrology and Fluid/Electrolyte Physiology: Neonatology Questions and Controversies by William Oh and J. Fernando Arias
3. Anatomy and Physiology of the Kidney by Arthur C. Guyton
4. Human Anatomy by Kenneth S. Saladin
5. Robbins & Cotran Pathologic Basis of Disease by Vinay Kumar, Abul K. Abbas, Jon C. Aster

2nd YEAR: III SEMESTER

		L	T	P	C
RDTT2502	**Pharmacology Related to Renal Dialysis Technology**				
	Paper 2	**3**	**1**	**0**	**4**

Course Description:

This course explores the impact of drugs on kidney health, including renal excretion, pharmacokinetics in kidney disease, and drug dosing in renal failure. It covers diuretics, antihypertensives, and dialyzable drugs, along with essential vitamins and minerals for dialysis patients, disinfectants, hemodialysis concentrates, and peritoneal dialysis fluids.

Course Objective:

Students undergoing this course are expected to:

1. To understand the fundamentals of pharmacology related to kidney health and disease.
2. To know about various hemodialysis concentrates and peritoneal dialysis fluids.
3. To understand the pharmacology of various drugs used as dialyzable agents.
4. To comprehend the detailed pharmacology of various antihypertensive drugs and diuretics.
5. To know the appropriate dosing of anticoagulants during dialysis and their effects.

Unit 1 Drug Interaction and Kidney 12 hrs

- Explain the effect of drugs on kidney health.
- Explain the renal excretion of drugs.
- Drug handling in advanced chronic kidney disease
- Explain the effect of pharmacokinetics in reduced kidney function individuals.
- The effect of uraemia on drug pharmacokinetics
- Drug dosing in Renal Failure

Unit 2 Drugs on Blood Pressure 12 hrs

- Antihypertensives – classification, actions, dosage, side effects and contraindications, special reference during dialysis,
- Adrenergic drugs
- Diuretics – classification, actions, dosage, side effects & contraindications

Unit 3 Drugs Used among Dialysis Patients. 12 hrs

- Vitamin D & its analogues,
- Phosphate binders
- Iron
- folic acid & other vitamins needed for dialysis patients.
- Erythropoietin in detail
- Heparin including low molecular weight heparin.
- Protamine sulphate

Unit 4 Disinfectants and Dialyzable drugs 12 hrs

- Formalin, sodium hypochlorite, hydrogen peroxide – role as disinfectants & adverse effects of residual particles applicable to formalin.
- Drugs & dialysis, Dialyzable drugs – phenobarbitone, lithium, methanol etc

Unit 5 Composition of Dialysis fluid 12 hrs

- Peritoneal dialysis fluid in particular hypertonic solutions – composition
- Potassium exchange resins with special emphasis on the mode of administration
- Haemodialysis concentrates – composition & dilution (acetate & bicarbonates).

Course learning outcomes: At the end of the course the students should be able

1. To know about the fundamentals of pharmacology
2. To know about various hemodialysis concentrates and peritoneal dialysis fluid
3. To understand the pharmacology of various drugs used as dialyzable agents.
4. To understand the detailed pharmacology of various antihypertensive drugs and diuretics.
5. To know the dose of anticoagulation during dialysis and its effects.

Textbooks:

1. Pharmacology for Dental & Allied Health Sciences, Padmaja Udayakumar.
2. Oxford Handbook of dialysis-2nd edition-Jeremy Levy, Julie Morgan, Edwina Brown
3. Renal Nursing – by Nicola Thomas
4. Principles and Practice of Dialysis – by William L Henrich, MD

References:

1. Review of Haemodialysis for Nurses and Dialysis Personnel – by Judith Z Kallenbach
2. Indian Journal of Nephrology-Indian Society of Nephrology Guidelines for Haemodialysis Unit
3. Replacement of Renal Function by Dialysis – Edited by J.F Maher

2nd YEAR: III SEMESTER

		L	T	P	C
RDTT2503	**Concepts of Renal Diseases**				
	Paper 3	**3**	**1**	**0**	**4**

Course Description:

This course provides an in-depth understanding of renal assessment, kidney diseases, and their manifestations. It covers urological diseases, special situations such as pregnancy and hereditary conditions, and the interaction between kidney, liver, and cardiac diseases. The course emphasizes diagnosis, management, and prevention strategies for various renal conditions.

Course Objective:

Students undergoing this course are expected to:

1. To understand the various types and methods of renal assessment.
2. To learn about the causes, risk factors, and clinical features of acute and chronic kidney diseases.
3. To identify and manage the manifestations of renal failure, including electrolyte disorders, renal anemia, and cardiovascular complications.
4. To recognize and address common urological diseases and their impact on kidney health.
5. To comprehend the special considerations and management of kidney-related conditions in pregnancy, hereditary diseases, and interactions with liver and cardiac diseases.

Unit 1 **Renal Assessment** **12 hrs**

1. Renal assessment types

- List the importance of renal assessment.
- List the types and methods of renal assessment.
- List the routine investigations (blood tests & urinalysis) done for a normal person for renal assessment.
- List the routine investigations (blood tests) done for a CKD person.

2. Creatinine

- Explain creatinine production, its normal range, and excretion by the kidneys in the human.
- Explain the importance of creatinine in renal health.
- List the factors affecting creatinine level.
- Name and list the methods of the creatinine-related tests and their importance to assess kidney health.

3. Renal Clearance

- Define GFR and eGFR.
- Identify the CKD stages based on GFR.

- Name the formulae used to calculate eGFR and list the factors affecting eGFR.
- Explain the method of GFR measurement.
- Explain filtration markers.
- Define renal clearance.
- Relate renal clearance concept with the renal assessment.
- Calculate the renal clearance by using clearance formula.

Unit 2 Kidney Disease 12 hrs

1. Acute Kidney Injury

- Define AKI; Classify AKI according to RIFLE,AKIN and KDIGO
- List & explain the causes of AKI.
- List the risk factors for AKI.
- List the clinical features of AKI.
- List the complications of AKI.
- List the investigations done for diagnosis of AKI and explain their importance.
- List the treatment options; Describe the importance of each treatment option in AKI; List the preventive measures.

2. Chronic Kidney Disease

- Define & Classify CKD stages.
- List the causes of CKD and explain the major causes of CKD.
- List the risk factors & discuss the modifiable risk factors for CKD.
- List & identify the clinical features.
- List the complications of CKD.
- List the investigations done for the diagnosis of CKD & list their importance.
- List the treatment options for CKD & explain the stage-wise CKD management.

Unit 3 Manifestations of renal failure 12 hrs

1. **Water and electrolyte disorders**

- Recall water disorders & electrolyte disorders in CKD
- Explain the hypovolemic state in CKD.
- Explain the hypervolemia in CKD.
- Identify the clinical features of fluid Complications of Chronic renal Failure disorders and management.
- Identify the clinical features, causes prevention, and management of each electrolyte disturbance in severe renal failure.

2. **Renal anaemia**

- Recall renal anaemia and list the special features of renal anaemia.
- Explain the clinical aspects related to the pathophysiology of renal anaemia.
- Explain the diagnostic workup and monitoring of anaemia in chronic kidney disease Explain the causes of renal anaemia and its prevention.
- Explain the therapeutic methods of renal anaemia and their adverse effects.

3. **Mineral bone disorders**

- Recall mineral bone disorders in CKD.
- Explain bone pathophysiology in CKD.
- Classify the types of bone disorders in CKD.
- Explain each type of bone disorders and its causes, clinical features, diagnosis, prevention & management.

4. **Endocrine disorders**

- Recall the endocrine disorders in kidney failure.
- Explain the pathophysiology of endocrine hormones in CKD and its management.

5. **Cardiovascular disorders**

- List the traditional and non-traditional cardiovascular disease risk factors.
- List the cardiovascular disorders found in CKD & outline the major cardiovascular disorders (Pericarditis, Congestive heart failure, Ischemic Heart Disease, Left Ventricular Hypertrophy)
- List the risk factors and causes of major cardiovascular disorders in CKD.
- List their signs and symptoms.
- List the investigations.
- Explain the prevention and management of these disorders.

6. **Gastrointestinal disorders**

- List the gastrointestinal disorders of CKD.
- List the causes and management of these disorders.

7. **Skin disorders**

- List the skin layers and their functions.
- Describe dermatological manifestations.
- List the signs and symptoms.
- Explain the causes and management of these disorders.

Unit 4 **Urological diseases** **12 hrs**

- Obstruction
- Urinary Tract Infection
- Urolithiasis
- Reflux and congenital anomalies
- Tumours of the Kidney
- Asymptomatic urinary abnormalities

Unit 5 **Other special situations** **12 hrs**

1. **Pregnancy and kidney**

- Physiological changes in renal circulation during pregnancy,
- Hypertensive disorders of pregnancy,
- Cortical necrosis,
- Effect of preexisting kidney disease on pregnancy

2. **Hereditary diseases involving kidney**

- Alports and alport like syndromes,
- Polycystic kidney disease,
- Medullary cystic kidney disease,

3. **Kidney in liver and cardiac diseases**

- Cardiorenal syndromes.
- Hepatorenal syndromes.

Course learning outcomes:

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

1. Identify different Diseases of the Urinary System.
2. Evaluate a patient, whether he is in Acute Renal Failure or Chronic Renal Failure.
3. Apply the Principles of Dialysis and its application during therapy according to the patient's.
4. condition.
5. Understand the functioning of the dialysis machines and their features.
6. Apply the various aspects of patient care during therapy time.

Textbooks

1. Brenner and Rector's The Kidney by Maarten W. Taal, Glenn M. Chertow, Philip A. Marsden, Karl Skorecki, Alan S. L. Yu, and Barry M. Brenner
2. Comprehensive Clinical Nephrology by Richard J. Johnson, John Feehally, and Jürgen Floege
3. Clinical Physiology of Acid-Base and Electrolyte Disorders by Burton David Rose and Theodore W. Post
4. Pathophysiology of Renal Disease and Hypertension by A. Fogo and M.D. Kashgarian

Reference Books

1. Handbook of Dialysis by John T. Daugirdas, Peter G. Blake, and Todd S. Ing
2. Oxford Textbook of Clinical Nephrology by Neil Turner, David Goldsmith, Christopher Winearls, Jonathan Himmelfarb, and Giovanni F. M. Strippoli
3. Principles and Practice of Dialysis by William L. Henrich
4. The Kidney in Health and Disease by Robert W. Schrier

2nd YEAR: III SEMESTER
PRACTICAL SYLLABUS

		L	T	P	C
RDTL2501	**Clinical skills I**				
	Paper-IV	**0**	**0**	**12**	**6**

Course Description:
This course provides comprehensive training on infection control, dialysis unit design, aseptic techniques, and vital signs measurement. It emphasizes patient approach methods, including pre- and post-dialysis assessment, and the importance of proper documentation and workflow protocols within the dialysis unit for effective patient care.

Course Objective:
Students undergoing this course are expected to:

1. To understand the components and protocols of infection control in a hospital and dialysis unit.
2. To learn the design and functionality of a dialysis unit, including the roles and responsibilities of its members.
3. To master aseptic techniques and the use of personal protective equipment (PPE).
4. To measure, monitor, and interpret vital signs accurately, including actions for abnormal readings.
5. To develop skills in patient approach, assessment, and documentation pre- and post-dialysis.

Unit 1 **Infection control** **30 hrs**

- Components of infection control
- Describe the protocol for the hospital & dialysis unit.
- Identify the personal protective equipment (PPE), handle PPE as per instructions and explain its importance.
- Identify the specific clinical features of the infectious cases.
- Demonstrate the steps of waste management.

Unit 2 **Dialysis Unit Design** **30 hrs**

- Introduction to dialysis room
- Identify the various areas in the dialysis unit and explain their importance.
- Recognize the members of the dialysis unit, designations, and job responsibility.
- Explain the protocol to establish a dialysis unit.
- Identify the various medical equipment of the dialysis unit and explain their use and work instructions.

Unit 3 **Aseptic techniques** **30 hrs**

- Methods of sterile techniques
- Explain and follow hand wash steps and personal protective equipment.

- Explain different aseptic techniques and follow in the clinical scenario.
- Identify the sterile materials, sterilant and disinfectants to maintain the sterility.

Unit 4 Vital signs 30 hrs

- Vital signs measurement
- Explain the indications to check vital signs and frequency of monitoring. Follow the methods of measurement and documentation.
- Identify the equipment used for measuring and monitoring the vital signs.
- Explain the actions to be taken during the abnormal reading.
- Identify the clinical features and correlate them with the abnormality and explain the action plan.

Unit 5 Patient approach 30 hrs

- Methods of patient approach
- Describe the workflow in the dialysis unit and list the protocols of the dialysis unit.
- Practice to improve the skills in infection control, vital signs measurement, patient approach, identifying the patient's general condition & action plan in the clinics and documentation.
- Make use of the knowledge obtained and be able to approach patients in the clinical scenario.
- Practice to do the patient assessment pre & post-dialysis.
- Assist in the pre-setup and dialysis record documentation.

Course learning outcomes:
After completion of the course, a student will be able to:

1. Identify different infection control practices in dialysis centres.
2. Understand the components of a dialysis centre.
3. Understand the different aseptic techniques present in the dialysis centre.
4. Know how to take vitals.
5. Understand how to approach a dialysis patient.

Textbooks:

1. Oxford Handbook of dialysis-2nd edition-Jeremy Levy, Julie Morgan, Edwina Brown
2. Renal Nursing – by Nicola Thomas
3. Principles and Practice of Dialysis – by William L Henrich, MD

References Books:

1. Review of Haemodialysis for Nurses and Dialysis Personnel – by Judith Z Kallenbach
2. Indian Journal of Nephrology-Indian Society of Nephrology Guidelines for Haemodialysis Unit
3. Replacement of Renal Function by Dialysis – Edited by J.F Maher

2nd YEAR: III SEMESTER
UNIVERSITY CORE - III

TAUT2101 **HEALTH AND WELLNESS** **L T P C**
3 0 0 3

Course Description:
The course is designed to help students to learn more about human health. This course helps to understand how current health knowledge helps to make future human beings even stronger and healthier.

Course Objectives:
1. To help understand the importance of a healthy lifestyle
2. To familiarize students about physical and mental health
3. To create awareness of various lifestyle related diseases
4. To understand the multiple dimensions of health and wellness, including physical, mental, emotional, social, and environmental aspects
5. To Equip students with the knowledge and skills to develop, implement, and maintain healthy lifestyle practices

UNIT-I **9 Hrs**
Define and differentiate health and wellness, Importance of health and wellness, Basic concepts of genetics, including genes, DNA, chromosomes, and inheritance patterns. Genetic factors affecting macronutrient (carbohydrates, proteins, and fats) digestion. Genetic variations associated with micronutrient (vitamins and minerals) digestion, malnutrition, under nutrition and over nutrition

UNIT-II **9 Hrs**
Brief overview of Body systems – Skeletal system, Muscular system, Circulatory System, Lymphatic system, Cardiovascular system, Respiratory system, Nervous system (Central nervous system, Peripheral nervous system, Somatic and Autonomic nervous systems), Digestive system, Urinary system, Endocrine system, Reproductive system, Integumentary system

UNIT-III **9 Hrs**
Sedentary lifestyle and its risk of disease, Lifestyle Disease and its Management, Factors affecting mental health - Stress, anxiety, and depression, Identification of suicidal tendencies, Substance abuse (Drugs, Cigarette, Alcohol), de-addiction, counselling and rehabilitation. Four Vital signs- Pulse rate, Respiratory rate, Blood pressure, Body temperature, other measurements-Body mass index, Waist-Hip Ratio, Basal Metabolic Rate

UNIT-IV **9 Hrs**
Risk factors and Pathology of the following Diseases and their Management –
- Diabetes
- Hypertension

- Coronary Heart Disease
- Obesity
- Osteoporosis
- Osteoarthritis
- Rheumatoid-arthritis
- Cancers (Blood, Breast, Brain, Lung, Liver and Kidney)
- Polycystic ovarian syndrome (PCOS)
- Pain (including Low Back pain)

UNIT-V **9 Hrs**

Introduction to Functional Foods; Nutrients and Bioactive Compounds in Functional Foods; Functional Foods for Cardiovascular Health, Weight Management, Immune Function, Cognitive Health, Chronic Disease Prevention; Yoga and its importance in Health and Wellness

Course Outcomes:

Upon successful competition of the course the student would be able to -

1. Understand the relationship between fitness and wellness
2. Gain knowledge regarding various aspects and its practical implication for Wellbeing.
3. Learn about behavior change theories and strategies for promoting healthy habits such as exercise, stress management, and nutrition
4. Study techniques for setting realistic health goals, creating wellness plans, and overcoming barriers to maintaining a healthy lifestyle.
5. Learn about the principles of a balanced diet, regular physical activity, mental health management, social relationships, and environmental factors that influence health

Textbooks:

1. Physical Activity and Health by Claude Bouchard, Steven N. Blair, William L. Haskell.
2. Mental Health Workbook by Emily Attached & Marzia Fernandez, 2021.
3. Mental Health Workbook for Women: Exercises to Transform Negative Thoughts and Improve WellBeing by Nashay Lorick, 2022.

Reference Books:

1. Lifestyle Diseases: Lifestyle Disease Management, by C. Nyambichu & Jeff Lumiri, 2018.
2. Physical Activity and Mental Health by Angela Clow & Sarah Edmunds, 2013.

2nd YEAR: III SEMESTER
UNIVERSITY ELECTIVE - III

TAUT2201 COMMUNITY ENGAGEMENT L T P C
3 0 0 3

Course Description:
This course provides degree-seeking students with an array of opportunities to engage in an immersive community service-learning experience. It further helps to understand the resources, optimize the recourses in future days, and address the gaps in the communities.

Course Objectives:
Students undergoing this course are expected to:

1. Understand community issues, needs, problems, strengths and recourses
2. Demonstrate the ability to work with a diverse population
3. Formulate more precise personal and professional life goals
4. Demonstrate the ability to communicate effectively and collaborate with institutions and public
5. Demonstrate the ability to take initiative, follow directions, lead, and solve problems

UNIT-I Social Structure 5 Hrs
Concept of Society; Community; Association and Institution; Individual and Society; Social Groups- Meaning, Characteristics and Classification; Social Process; Social Change; Structure and Characteristics of urban, rural and tribal communities.

UNIT-II Social Organisation and Disorganisation 5 Hrs
Social Organisation- meaning, elements and types; Voluntary Associations; Social System- definition, types and roles; Social Control- meaning, aims and process of social control; Social norms, morals and values; Social Disorganisation- definition, causes, control and planning.

UNIT-III Social Problems and Welfare State 8 Hrs
Social Problems- Poverty, Housing, food supply, illiteracy, Prostitution, dowry, child labour, child abuse, delinquency, crime, substance abuse, HIV/ AIDS, Covid-19; Venerable Group- elderly, handicapped, minority and another marginal group; Fundamental rights of individual, women and children, NITI Aayog, Ministry of Social Justice & Empowerment, Ministry of Rural Development, Ministry of Tribal Affairs, Ministry of Health & Family Welfare, and Role of Local Bodies for transformation; Corporate Social Responsibility; Social Work.
Proposed Field activities: Field visit- Interaction with Local Self Government, Visit of Gram Panchayat & Staff, Socio-Economic Survey *(5 hours/ one day).*

UNIT-IV Communication Strategies and Community Engagement 18 Hrs
Social Behaviour Change Communication (SBCC); Focused Group Discussion; SWOT analysis; Participatory Learning Action.
Proposed Field activities: Meeting, Mobilizing, Transect Walk, Identification of Natural Leaders, Timeline, Mapping, Case Study, Documentation; Outreach- Special Camp Viz.,

Health Education, Medical Camp, Environment Protection, Sustainability, Technology & Innovation, Nutrition, Swachh Bharat (*15 Hours/ 4 days).*

UNIT-V Sustainable Development Goals 2023 **9 Hrs**

Millennium Development Goals; Sustainable Development Goals (SDGs) 2030- 17 Goals; SDG Pyramid; Localizing SDGs; Gram Panchayat Development Plan (GPDP).

Proposed Field activities: Mapping the activities with SDG 2030 (6 Hours/ 1 day).

Course Outcomes:

By the end of the course, students should be able to:

1. Understand and apply the concept related to community and social structure.
2. Develop the ability to involve and work with the social system.
3. Understand various social problems emerging in society and solve them.
4. Apply SBCC tools and SWOT analysis.
5. Appreciate Sustainable Development Goals and contribute beyond SDG 2030.

Textbooks:

1. Krishna Kant Singh & Ram Shankar Singh, (2011), Social Work and Community Development.
2. Makara Rumley, (2020), Modern-Day Strategies for Community Engagement: How to Effectively Build Bridges Between People and the Bottom Line.

Reference Books:

1. Hall, B. L., Tandon, R. & Tremblay, C. (2015). Strengthening Community University Research Partnerships: Global Perspectives.
2. http://unescochaircbrsr.org/unesco/pdf/UNESCO%20Book%20Web_with%20BookCovers_Aug202015_FINAL.pdf
3. GUNi (Ed.). (2014). Knowledge, Engagement and Higher Education: Contributing to Social Change (Higher Education in the World 5). Hampshire (UK)/New York (USA): Palgrave Macmillan.
4. UNESCO Chair in Community Based Research & Social Responsibility in Higher Education (2015). Institutionalizing Community University Research Partnerships: A User's Manual. http://unescochair-cbrsr.org/unesco/pdf/CURP_Guidelines.pdf
5. Vallaeys, F. (2014). University Social Responsibility: A Mature and Responsible Definition. In GUNi (Ed.), Knowledge, Engagement and Higher Education: Contributing to Social Change (Higher Education in the World 5) (pp. 88-96).

2nd YEAR: III SEMESTER
UNIVERSITY ELECTIVE - III

TAUT2202 CLINICAL NUTRITION L T P C
3 0 0 3

Course Description:
Upon completion of the course, students will be prepared to apply their knowledge of clinical nutrition to promote health and manage diseases effectively, contributing to multidisciplinary healthcare teams. This course is essential for healthcare professionals, nutritionists, dietitians, and anyone interested in understanding the role of nutrition in clinical care and wellness promotion.

Course Objectives:
To enable the students to:

1. Develop proficiency in conducting comprehensive nutritional assessments using various methods such as dietary recall, biochemical tests, and anthropometric measurements.
2. Understand the impact of diet on the prevention, management, and progression of chronic diseases commonly encountered in clinical practice, including diabetes, cardiovascular diseases, and obesity.
3. Acquire skills in designing individualized nutrition plans tailored to specific patient needs and health conditions across different life stages (e.g., pediatric, geriatric, maternal).
4. Evaluate ethical issues related to nutritional counseling, respecting cultural dietary practices, and providing evidence-based dietary recommendations within clinical settings.
5. Critically appraise current research and controversies in clinical nutrition, integrating evidence-based guidelines into decision-making processes to optimize patient outcomes.

UNIT-I 9 Hrs

Introduction to nutrition - Food as source of nutrients, functions of food, definition of nutrition, nutrients & energy, adequate, optimum & good nutrition, malnutrition, Effect of cooking & heat processing on the nutritive value of foods, role of nutrition in prior pregnancy, during pregnancy, during lactation, in adolescence, Fitness, Athletics & Sports

UNIT-II 9 Hrs

Food guide - Basic five food groups How to use food guide (according to R.D.A.) Interrelationship between nutrition & health: - Visible symptoms of good health, Use of food in body - Digestion, Absorption, transport & utilization, Role of fibres in human nutrition. malnutrition, Protein energy malnutrition.

UNIT-III 9 Hrs

Biomolecules as a nutrient: Carbohydrates: Functions, classification, food sources, storage in body. Fats & oils: composition, saturated and unsaturated fatty acids, classification, food

sources, function of fats. Proteins - composition, sources, essential & non-essential amino acids, functions, Protein deficiency.

UNIT-IV **9 Hrs**

Water minerals and Vitamins: Water - as a nutrient, function, sources, requirement, water balance & effect of deficiency. Minerals - macro & micronutrients. - Functions, sources. Bioavailability and deficiency of Calcium, Iron, Iodine, Sodium & Potassium, Vitamins (water & fat soluble) - definition, classification & functions.

UNIT-V **9 Hrs**

Role of nutrients in disease management: Importance of nutrition in kidney and liver diseases with respect to their nutritional value. Case study- diabetes, cancer, Osteoporosis, Heart related diseases, role of Antioxidants as a nutrient in disease control.

Course Outcomes:

Upon completion of the course, the student shall be able to

1. Demonstrate proficiency in conducting thorough nutritional assessments using a variety of methods, interpreting results, and applying findings to develop dietary recommendations.
2. Apply knowledge of macro and micronutrients, dietary supplements, and hydration to design effective nutrition plans for individuals with diverse health needs and conditions.
3. Implement dietary interventions that contribute to the prevention, management, and improvement of chronic diseases, integrating nutritional strategies into comprehensive healthcare plans.
4. Evaluate and address ethical considerations in nutritional counseling, respecting cultural diversity and individual preferences while adhering to professional standards and evidence-based practices.
5. Critically analyze current research literature in clinical nutrition, utilizing evidence-based guidelines to make informed decisions and enhance patient outcomes in clinical settings.

Textbooks:

1. Kathleen ML and Escott S. Krause's Food, Nutrition and Diet Therapy, 9thedn, W.B. Saunders Company Pennsylvania, 2000.
2. Davidson S, Passmore R, Breck JFT. Human Nutrition and Dietetics, The English Language Book Society and Churchill Livingston, 1975.

Reference Books:

1. Thomas B. Manual of Dietetic Practice. Blackwell Scientific Publications, Oxford, London, 1988.
2. Robinson CH. Normal and Therapeutic Nutrition. Oxford Publishing Co, Bombay, 1972.

2nd YEAR: III SEMESTER
UNIVERSITY ELECTIVE - III

TAUT2203 EMOTIONAL INTELLIGENCE AND MENTAL HEALTH L T P C
3 0 0 3

Course Description:
This course will explore the relationship between emotional intelligence and mental health. Students will learn about the importance of emotional intelligence in promoting positive mental health, and will develop skills in recognizing and regulating emotions, managing stress, and building resilience. The course will cover topics such as emotional intelligence theories, emotional regulation strategies, mindfulness, self-compassion, and the impact of emotions on mental health.

Course Objectives:
By the end of this course, students will be able to:

1. Understand the role of emotional intelligence in mental health
2. Develop skills in recognizing and regulating emotions
3. Understand the impact of stress on mental health and develop strategies for managing stress
4. Understand the importance of self-compassion in promoting positive mental health
5. Develop critical thinking and analytical skills in relation to emotional intelligence and mental health

UNIT-I **9 Hrs**
Introduction to Emotional Intelligence and Mental Health; Definition and history of emotional intelligence, the role of emotional intelligence in mental health, Professional organizations and ethical codes related to emotional intelligence

UNIT-II **9 Hrs**
Theoretical Perspectives on Emotional Intelligence; Ability model of emotional intelligence, Trait model of emotional intelligence, Mixed model of emotional intelligence, Mindfulness and Mental Health, Mindfulness and Mental Health.

UNIT-III **9 Hrs**
Stress and Mental Health, Resilience and Mental Health; The impact of stress on mental health, Stress management techniques (e.g., relaxation techniques, time management, exercise) Definition and benefits of resilience, Factors that contribute to resilience, Building resilience in oneself and others.

UNIT-IV **9 Hrs**
Self-Compassion and Mental Health, Emotions and Relationships; Definition and benefits of self-compassion, Practice of self-compassion, Relationship between self-compassion and mental health, Emotions and Relationships

UNIT-V **9 Hrs**

Emotional Intelligence in the Workplace, Ethics and Emotional Intelligence; Emotional intelligence and job performance, the role of emotional intelligence in leadership, Emotional intelligence training in the workplace, Ethical issues related to emotional intelligence, Professional codes and standards related to emotional intelligence

Final Project Presentations

Students will present their final projects, which may include research papers, case studies, or other projects related to emotional intelligence and mental health.

Course Outcomes:

1. Able to provide an overview of emotional intelligence and mental health
2. Will understand the importance of emotional intelligence
3. The impact of stress on mental health, Stress management techniques
4. Relationship between emotional intelligence and mental health
5. Understand the importance of Emotional Intelligence in the workplace.

Textbooks:

1. Neff, K. (2011). Self-compassion: Stop Beating Yourself Up and Leave Insecurity Behind. HarperCollins.
2. Goleman, D. (2007). Emotional Intelligence (10th ed.). Bantam Books.

Reference Books:

1. Covey, Stephen R., author. (2020). The 7 habits of highly effective people: powerful lessons in personal change. New York :Simon & Schuster.
2. Tolle, E. (2016). The power of now: A guide to spiritual enlightenment. Yellow Kite.

2nd YEAR: III SEMESTER
UNIVERSITY ELECTIVE - III

TAUT2204 **HUMAN RIGHTS** **L T P C**
3 0 0 3

Course Description:

This course offers a comprehensive introduction to the field of human rights, exploring the historical development, philosophical foundations, and contemporary issues surrounding the protection and promotion of human rights globally. Students will engage with key concepts, major international human rights instruments, and the roles of various actors in the human rights landscape.

Course Objectives:

This course is intended to prepare the students to

1. Know Human Rights, its need importance, and kind of rights
2. Understand the Human Rights of vulnerable groups
3. Identify and analyze key international human rights documents and treaties.
4. Know about the institutions enforcing the Human Rights
5. Understand the violations of Human Rights and the safeguards available to citizens.

UNIT-I Concept of Human Rights – Indian and International Perspectives **5 Hrs**

a. Evolution of Human Rights
b. Definitions under Indian and International documents

UNIT-II Broad classification of Human Rights and Relevant Constitutional Provisions. - **11 Hrs**

c. Right to Life, Liberty and Dignity
d. Right to Equality
e. Right against Exploitation
f. Cultural and Educational Rights
g. Economic Rights
h. Political Rights
i. Social Rights

UNIT-III Human Rights of Women and Children **11 Hrs**

a. Social Practice and Constitutional Safeguards
b. Female Foeticide and Infanticide
c. Physical assault and harassment
d. Domestic violence
e. Conditions of Working Women

UNIT-IV Institutions for Implementation **9 Hrs**

a. Human Rights Commission
b. Judiciary

UNIT-V Violations and Redressal **9 Hrs**

c. Violation by State
d. Violation by Individuals
e. nuclear weapons, bio war and terrorism
f. Safeguards.

Course Outcomes:

After the successful completion of this course the students will be able to

1. Know about Human Rights, its need importance and kind of rights
2. Understand the Human Rights of vulnerable groups
3. Know about the institutions enforcing the Human Rights
4. Understand the violations of Human Rights and the safeguards available to citizens.
5. Develop critical thinking and analytical skills by examining case studies and current events.

Textbooks:

1. Human Rights in India: Historical, Social and Political Perspectives (Law in India) Hardcover – Illustrated by Chiranjivi J. Nirmal (Author)
2. History of Human Rights, Narrated by Andrea Giordani

Reference Books:

1. The Universal Declaration of Human Rights- UNO publication
2. Making Sense of Human Rights- by James Nickel.
3. The Idea of Natural Rights- by Brian Tierney.
4. The Law of Peoples- by John Rawls.
5. On Human Rights. - by James Griffin.
6. Human Rights: Contemporary Issues by V.K. Ahuja
7. Human Rights, M Girija, S Chand Edu tech Pvt. Ltd.

2nd YEAR: III SEMESTER
UNIVERSITY ELECTIVE – III

TAUT2205 **INDUSTRY 4.0** **L T P C**
3 0 0 3

Course Description:
The Industry 4.0 aims to the "smart" and connected production systems that are designed to sense, predict, and interact with the physical world, so as to make decisions that support production in real-time. In manufacturing, it can increase productivity, energy efficiency, and sustainability.

Course Objectives:
The objective of this course is to make students:

1. To impart basic idea in Industry 4.0.
2. To provide students with good depth of knowledge of designing Industrial 4.0 Systems for various application.
3. To learn the artificial intelligence and machine learning techniques/ tools in health care.
4. To understand the bigdata technology and its applications in health care.
5. To learn the design and analysis of Industry 4.0 systems for healthcare applications.

UNIT-I **9 Hrs**

Introduction: Introduction, Historical Context, General framework, Application areas, Dissemination of Industry 4.0 and the disciplines that contribute to its development, Artificial intelligence, The Internet of Things and Industrial Internet of Things, Additive manufacturing, Robotization and automation, Current situation of Industry 4.0.

UNIT-II **9 Hrs**

Cyber Physical System: Introduction to Cyber Physical Systems (CPS), Architecture of CPS - Components, Data science and technology for CPS, Emerging applications in CPS in different fields. Case study: Application of CPS in health care domain.

UNIT-III **9 Hrs**

Artificial Intelligence & Machine Learning: Artificial Intelligence: Artificial Intelligence (AI) – What & Why? History of AI- Foundations of AI, the AI Environment, Application Domains and Tools.

Machine Learning- Introduction–Definition–Types of Machine Learning–Supervised, Unsupervised, Reinforcement Learning–Algorithms for Machine Learning–Problems solved by Machine Learning-Applications areas of Machine Learning in Health care.

UNIT-IV **9 Hrs**

Big Data & Cloud Computing: What is Big Data, Evolution of Big Data, sources of Big Data? Characteristics of Big Data Vs – Big Data Myths- Data Discovery-Traditional Approach, Big Data Technology: Big Data Technology Process– Applications of Bigdata in Healthcare.

Cloud Computing: Need– Definition – Types of Cloud-Types of Services– SaaS, PaaS, Iaas

UNIT-V **9 Hrs**

Impact of Industry 4.0 on Healthcare Industry: An introduction Discover how Industry 4.0 is impacting and transforming the Healthcare Industry including self-diagnosis systems for patients, real-time diagnosis, 3D printed organs and Internet-of-Medical Things (IOMT).

Course Outcomes:

Upon completion of the course, student will be able to:

1. Understand the basic concepts of Industry 4.0 and the other related fields
2. Analyse, design and develop systems to solve the Engineering problems by integrating thermal, design and manufacturing Domains.
3. Understand the various artificial intelligence and machine learning tools in health care domain.
4. Apply bigdata technology in health care applications.
5. Apply the learned Engineering knowledge for the Development of society and self.

Textbooks:

1. Jean-Claude André, ―Industry 4.0, Wiley- ISTE, July 2019, ISBN: 781786304827, 2019.
2. Diego Galar Pascual, Pasquale Daponte, Uday Kumar, ―Handbook of Industry 4.0 and SMART Systems, Taylor and Francis,2020

Reference Books:

1. P. Kaliraj, T. Devi, BigDataApplicationsinIndustry4.0, 2022, ISBN9781032008110, CRC Press, Taylor & Francis Group
2. P. Kaliraj, Devi Thirupathi, "Artificial Intelligence Theory, Models and Applications", Auerbach Publications, CRC Press, Taylor and Francis group, 2021.
3. Ethem Alpaydin, "Introduction to Machine Learning", Third Edition, MIT Press, 2014.
4. P. Kaliraj, T. Devi, Industry 4.0 and Education: Transformative Technology and Applications, 2022, CRC Press, Taylor & Francis Group.

2nd YEAR: III SEMESTER
UNIVERSITY ELECTIVE - III

TAUT2206 MEDICAL TERMINOLOGY L T P C
3 0 0 3

Course Description:
The purpose of this course is to develop a student's understanding and use of hospital and medical terminology. There is a focus on understanding the terns commonly used to identify the cause and effects of disease conditions.

Course Objectives:
1. To understand the associate medical terms with specific body systems.
2. To identify and interpret diagnostic and symptomatic terms related to the diseases specific to each body system.
3. To describe designated diagnostic testing procedures (laboratory, x-ray, surgical, pharmacy, etc.).
4. To Enable students to understand, use, and correctly pronounce a wide range of medical terms.
5. To Prepare students to effectively communicate with healthcare professionals and patients using accurate medical terminology.

UNIT-I **9 Hrs**
Basics of medical terminology, Specialties in a Hospital, The Human body in health and disease

UNIT-II **9 Hrs**
The Skeletal System, The Muscular System, The lymphatic and immune systems

UNIT-III **9 Hrs**
The Respiratory System, The Circulatory System, The Digestive System, The Urinary System

UNIT-IV **9 Hrs**
The Nervous system, Special senses - Eyes and Ears, Skin - The Integumentary system

UNIT-V **9 Hrs**
The Endocrine system, The Reproductive System, Diagnostic procedures, Nuclear Medicine and Pharmacology

Course Outcomes:
Upon successful completion of the course student would be –
1. Able to Identify and interpret complex medical terms by breaking them into their component word parts in order to decipher their meaning.
2. Able to understand common diseases and disorders of the body systems
3. Able to identify diagnostic tools and techniques for the common diseases and disorders of the human body

4. Able to interpret medical records, lab reports, and other documentation to ensure clear and precise communication within healthcare teams and with patients
5. Able to learn the roots, prefixes, and suffixes that form medical terms, as well as the terminology related to various body systems, diseases, procedures, and treatments. Students will be able to deconstruct complex terms into their component parts to understand their meanings.

Textbooks:

1. Medical Terminology for Health Professions, 7th Edition by Ann Ehrlich; Carol L Schroeder, ISBN 13: 9781111543297, Published by Delmar Cengage Learning (2013)
2. Workbook for Ehrlich/Schroeder's Medical Terminology for Health Professions, 7th by Carol Schroeder, Ann Ehrlich Published by Delmar Cengage Learning; 7th edition, 2012, ISBN-13 : 978-1111543280

Reference Books:

1. Quick and Easy Medical Terminology - With Access by Peggy C. Leonard, ISBN13: 978-0323595995, 9th Edition
2. Medical Terminology Systems: A Body Systems Approach - With Access by Barbara A. Gylys, ISBN13: 978-0803658677, 8th Edition
3. Understanding Medical Terminology by Agnes C. Frenay, ISBN13: 978-0697140586, 9th Edition

2nd YEAR: III SEMESTER
UNIVERSITY ELECTIVE - III

TAUT2207 **SOCIAL NETWORK ANALYSIS** **L T P C**
3 0 0 3

Course Description:

A thorough introduction to Social Network Analysis (SNA), an interdisciplinary topic that studies the connections and interactions between people, groups, and things in various social contexts, is provided in this course. Students will receive a broad understanding of the core ideas, approaches and uses of SNA in a variety of disciplines. The course will cover data gathering methods, network visualization, fundamental network metrics, sophisticated network ideas and practical SNA implementations. Students will learn the skills necessary to evaluate social networks and gain useful insights from intricate network data through hands-on exercises.

Course Objectives:

1. To introduce students to the foundational concepts and historical background of Social Network Analysis (SNA).
2. To familiarize students with the basic building blocks of social networks, including nodes and edges and different types of social networks (e.g., online, offline, professional, friendship).
3. To provide students with an understanding of key network measures such as degree centrality, betweenness centrality, clustering coefficients and network density.
4. To demonstrate real-world applications of SNA, such as social network mining, influence and opinion dynamics, social network marketing and cybersecurity.
5. To equip students with practical skills for analyzing and interpreting social network data.

UNIT-I **9 Hrs**

Overview of Social Network Analysis: Definition, history and key concepts. Nodes and Edges: Understanding the basic building blocks of social networks. Types of Social Networks: Exploring different types of social networks (e.g., online, offline, professional, friendship).Importance and Applications of SNA: How SNA is used in various fields (e.g., Engineering, Sociology, Psychology, Marketing and Business).

UNIT-II **9 Hrs**

Data Collection Methods: Techniques for gathering social network data (e.g., surveys, interviews, online platforms). Data Representation: Different formats for representing network data (e.g., adjacency matrix, edge list).Network Visualization: Introduction to visualization tools for nd interpreting network structures.

UNIT-III **9 Hrs**

Degree Centrality: Identifying influential nodes based on their connections. Betweenness Centrality: Understanding nodes that act as bridges in the network. Clustering Coefficients:

Analysing the degree of interconnectedness within local neighbourhoods. Network Density: Assessing the overall connectivity of a social network.

UNIT-IV **9 Hrs**

Small World Phenomenon: Exploring the "six degrees of separation" concept. Homophily and Social Influence: Understanding how social networks shape individuals' behaviour and beliefs. Network Resilience and Robustness: Examining the impact of node removal on the network's stability. Network Motifs: Identifying recurring patterns in complex social networks.

UNIT-V **9 Hrs**

Social Network Mining: Using SNA to extract meaningful patterns and insights from large-scale networks. Influence and Opinion Dynamics: Analyzing how information spreads through social networks. Social Network Marketing: Leveraging SNA for targeted marketing campaigns and product promotion. Online Social Networks and Cyber security: Understanding network-based threats and vulnerabilities.

Course Outcomes:

By the end of the course, students will be able to:

1. Comprehend the foundational concepts, methodologies and tools of Social Network Analysis.
2. Extract meaningful insights from social network data, identifying influential nodes and understanding network dynamics.
3. Apply SNA concepts to real-world challenges in areas such as marketing, cyber security and social dynamics.
4. Utilize SNA techniques to inform decision-making processes.
5. Conduct and interpret SNA in various domains effectively.

Textbooks:

1. Social Network Analysis: Methods and Applications" by S. K. Garg, 2019, Wiley India.
2. Introduction to Social Network Analysis: Concepts, Methods and Applications" by R. K. Singh, 2020, Springer India.

Reference Books:

1. Social Network Analysis: Methods and Applications" by Stanley Wasserman, Katherine Faust (1994, Cambridge University Press)
2. Analysing Social Networks" by Stephen P. Borgatti, Martin G. Everett, Jeffrey C. Johnson (2013, SAGE Publications)
3. Networks, Crowds and Markets: Reasoning About a Highly Connected World" by David Easley, Jon Kleinberg (2010, Cambridge University Press).

2nd YEAR: III SEMESTER
UNIVERSITY ELECTIVE - III

TAUT2208	**ANTIBIOTIC RESISTANCE & BIOMEDICAL WASTE MANAGEMENT**	**L T P C** **3 0 0 3**

Course Description:

This course covers antibiotics and drug resistance, including mechanisms and trends, and explores biomedical waste management, focusing on segregation, treatment, and disposal. Emphasis is placed on antimicrobial stewardship and modern technologies for handling biomedical waste and ensuring environmental safety.

Course Objectives:

Students undergoing this course are expected to:

1. Understand the history, mechanisms, and types of antibiotic resistance.
2. Analyse trends in drug resistance and actions to combat it.
3. Evaluate the consequences of antibiotic resistance and implement antimicrobial stewardship.
4. Learn principles and practices of biomedical waste management and environmental safety.
5. Utilize modern technologies and personal protective equipment for effective biomedical waste handling.

UNIT-I **9 Hrs**

Antibiotics: Antibiotic Resistance, History of antibiotics, How resistance happens and spreads, Types of resistance- intrinsic, acquired, passive.

UNIT-II **9 Hrs**

Drug resistance - I: Trends in drug resistance, Actions to fight resistance, Bacterial persistence, Antibiotic sensitivity

UNIT-III **9 Hrs**

Drug resistance - II: Consequences of antibiotic resistance, Antimicrobial Stewardship – Barriers and opportunities, tools and models in hospitals.

UNIT-IV **9 Hrs**

Biomedical waste management and environmental safety - I: Definition of Biomedical, Waste, Waste minimization, BMW – Segregation, collection, transportation, treatment and disposal (including colour coding).

UNIT-V **9 Hrs**

Biomedical waste management and environmental safety - II: Liquid BMW, Radioactive waste, Metals / Chemicals / Drug waste, BMW Management & methods of disinfection, Modern Technology for Handling BMW, Use of Personal protective equipment (PPE), Monitoring & controlling cross-infection (Protective devices).

Course Outcomes:

At the end of this course, students should be able to:

1. Explain antibiotic resistance, its history, and mechanisms.
2. Analyse trends and strategies in drug resistance management.
3. Assess the consequences of antibiotic resistance and implement antimicrobial stewardship.
4. Understand principles and practices of biomedical waste management.
5. Apply modern technologies and PPE for effective biomedical waste handling and infection control.

Textbooks:

1. "Antibiotics: Actions, Origins, Resistance" by Christopher Walsh
2. "Antimicrobial Stewardship: Principles and Practice" by Matthew Laundy, Lynda A. Sisson, and Matthew Dryden.

Reference Books:

1. "Biomedical Waste Management in Hospitals: A Manual for Health Professionals" by Sushrut S. N. H.

2nd YEAR: III SEMESTER
UNIVERSITY ELECTIVE – III

TAUT2209 BEHAVIOR CHANGE COMMUNICATION L T P C
3 0 0 3

Course Description:

This course introduces students to the fundamentals of behavioural theory, research and interventions in health education and promotion. The course will expose students to a wide range of theories, basic statistics and the use of open-source software in the analysis and evaluation of health aspects at the community level in a holistic manner. Furthermore, students will understand the concept of intersectoral and multidisciplinary coordination in order to improve data visualization in health education and promotion through the use of appropriate statistical tools.

Course Objectives:

1. To understand the behavioural, social and cultural factors associated with health and illness.
2. To explore factors that influence and barriers to practicing health behaviour and changing poor health habits across age groups.
3. To understand the structure of society, the role of society and various types of communication and identify the role of society, community, health education and communication in health.
4. To describe the methods, models, tools and processes used in understanding health behavior change, health education and promotion.
5. To apply relevant social and behavioural theories to diagnose and understand individual, social network, organizational, community and policymaker behaviours associated with the planning, implementation, evaluation and maintenance of community-based primary health care programs.

UNIT-I 5 Hrs

Introduction to Social and Health Behavioral Health, Importance of social and behavioral factors in health, Historical perspectives on population and diseases.

UNIT-II 8 Hrs

Health behavior: role of behavior factors in disease and disorders, Health behavior, health habits, Illness behavior, Practicing and changing health behavior, Barrier to modify poor health behavior, intervening with children, adolescents, adults and at risk, social determinants of Health, Changing health habits.

UNIT-III 12 Hrs

Basic concepts of society, community, and family, Society: features and types, Concept of culture: characteristics, elements, variability, social institutions: marriage and family. Working with communities, Community: Definition, concept of community participation, Benefits of community participation, Health communication, Communication: Definition, scope and

requirements, Types of communication, Components of communication, Communication stages, Common communication approach, Methods of communication, Characteristics of effective communication, Barriers of effective communication.

UNIT-IV **10 Hrs**

Health Behavior Models, Social Epidemiology, Health belief model, Theory of planned behavior, Transtheoretical Model and change process, Social network theory, Diffusion of innovation, Social reaction to diseases, Comparative health cultures, Health disparities.

UNIT-V **10 Hrs**

Introduction Social network analysis, Basic of social network analysis, Introduction to open-source software and classification in health approaches, Introduction to Node XL software, Install, data visualize, data analysis and application among community level for policy-maker behaviors associated with the planning, implementation, evaluation, and maintenance of community-based health programs.

Course Outcomes:

End of the course completion student would be

1. Understand behavioral, social and cultural factors associated with health and illness.
2. Develop strategies to address barriers to practicing healthy behaviors and changing poor health habits across age groups.
3. Analyze the structure of society and various types of communication and identify the role of society, community, health education and communication in health.
4. Apply appropriate methods, models, tools and processes for understanding health behavior change, health education and promotion.
5. Utilize SNA tools, strategies and social and behavioral theories to diagnose and understand individual, social network, organizational, community and policymaker behaviors in community-based primary health care programs.

Textbooks:

1. Essentials of health behavior: Social and behavioral theory in public health by Mark Edberg (Jones and Bartlett publishers
2. Mahajan BK. Methods in Biostatistics. Jaypee Brothers, Medical Publishers (p) Ltd., G16, EMCA House, 23/23B, Ansari Road, Daryaganj, Post Box: 7193, New Delhi 110 002, India, 1991. List Current Essential Reference

Reference Books:

1. Foster and Anderson: Medical Anthropology, Wiley, New York
2. Anderson & Taylor, Sociology: Understanding a Diverse Society.
3. Neubeck and Glasberg, Selected Material from Sociology: Diversity, Conflict, and Change.

2nd YEAR: III SEMESTER
UNIVERSITY ELECTIVE - III

TAUT2201A **DISABILITY MANAGEMENT** **L T P C**
3 0 0 3

Course Description:
Disability Management course is designed to provide students with an in-depth understanding of the strategies, practices, and policies essential for supporting individuals with disabilities in various settings. This course covers the principles and techniques of disability management, focusing on creating inclusive environments in the workplace, educational institutions, and the community.

Course Objectives:
1. Understand the social, medical, and legal aspects of disability.
2. Evaluate the impact of disability on individuals and society.
3. Analyse policies and regulations related to disability management.
4. Develop strategies for supporting individuals with disabilities in various contexts.
5. Promote inclusivity and diversity in the workplace and community.

UNIT-I Introduction to Disability Management **9 Hrs**
Definition and classification of disabilities**,** Historical perspectives on disability**,** Disability as a social construct**,** Medical aspects of Disability**,** Common medical conditions leading to disability**,** Assessing functional limitations and impairments

UNIT- II Social and Psychological Aspects of Disability **9 Hrs**
The impact of disability on quality of life, Stigma and discrimination, Coping and psychological adjustment to disability, Role of healthcare professionals in disability management, Psychological Interventions and Chronic Health Disorders; Therapies, Pharmacological Interventions, Individual Therapy, Relaxation, Stress Management and exercise, Social Support Interventions, Help on the Internet, Support Groups

UNIT- III Legal and Ethical Framework **9 Hrs**
Disability rights and legislation, Equal opportunity and anti-discrimination laws, Ethical considerations in disability management, Emerging technologies and their impact on disability management, the future of disability policy and practice

UNIT- IV Workplace Disability Management **9 Hrs**
Reasonable accommodation and the Americans with Disabilities Act (ADA), Return-to-work programs Workplace diversity and inclusion, Current Issues

UNIT- V Community and Public Health Approach **9 Hrs**
Community resources and services for individuals with disabilities, Accessibility and universal design Disability awareness and advocacy, Analysis of real-life cases in disability management,

Developing disability management plans, Accommodation strategies and their implementation, Current Issues and Future Trends

Course outcomes:

By the end of the course, the students would be able to:

1. Understand various aspects and causes of disability.
2. Get insight on the efficacy of interventions and therapies to deal disability.
3. Assess the ethical and legal consideration of disability.
4. Acknowledge the importance of ADA act and it implementation in workplace.
5. Know and participate in various community-based disability programs.

Textbooks:

1. Preventing chronic disease: a vital investment. WHO global report. Geneva, World Health Organization, 2005 (http://www.who.int/chp/chronic_disease_ report/en, accessed 15 May 2008).
2. Singh D. Transforming chronic care: evidence about improving care for people with long-term conditions. Birmingham, University of Birmingham, 2005.

Reference Books:

1. Chronic diseases [web site]. Geneva, World Health Organization, 2008 (http://www.who.int/topics/chronic_disease/en, accessed 15 May 2008).
2. National Center for Health Statistics definitions: health condition [web site]. Atlanta, United States Centers for Disease Control and Prevention, 2008.

2nd YEAR: III SEMESTER
UNIVERSITY ELECTIVE - III

TAUT2201B **DISASTER MANAGEMENT** **L T P C**
3 0 0 3

Course Description:
The Disaster Management course is designed to provide students with a comprehensive understanding of the principles, strategies, and practices essential for effectively managing disasters. This course explores the various types of natural and human-made disasters, their causes, impacts, and the processes involved in mitigating, preparing for, responding to, and recovering from such events.

Course Objectives:
The main objectives of this course are to:

1. To impart knowledge and concepts of disaster, disaster management and disaster risk reduction.
2. To enhance the students understanding on Hazard Vulnerability and Risk Analysis
3. To develop positive attitude towards practical response to different stages of disaster
4. To management by adopting advance technology and sustainable development.
5. To ensure disaster response skills in assessment, analysis, intervention and evaluation in the Practice of reducing disaster risk.

UNIT- I **9 Hrs**

Concepts of Disaster and Vulnerability

- Hazards and disasters - Concepts, vulnerability and risks
- Hazard and disaster type- Natural, Water-related, Pandemic and Human induced hazards and disasters
- Causes and impacts of disasters- Impact on natural eco-system; physical, psychological and social impact
- Disaster and financial resilience
- GIS and Remote Sensing

Disaster vulnerability profile of India - Specific to geographical regions and states (as per regional significance).

UNIT- II **9 Hrs**

Disasters Intervention Practices

- Disaster Management Cycle-Rescue, relief, rehabilitation, reconstruction, prevention, mitigation and preparedness
- Disaster risk reduction (ORR) - community based ORR, Institutions concerned with safety, Disaster mitigation and construction techniques as per Indian Standard
- Early warning systems
- Trauma and Stress management
- First-aid and emergency procedures

Awareness generation strategies for the community on safe practices in disaster (as per regional significance)

UNIT - III **9 Hrs**

Disaster Management

Components of disasters management - Preparedness of rescue & relief, mitigation, rehabilitation & reconstruction

Institutional framework of disaster management in India (NDMA-SDMA-DDMA, NDRF, Civic volunteers, NIDM),

Phases of disasters/risk management and post-disaster responses Compensation and insurance

UNIT- IV **9 Hrs**

Applications of remote sensing & GIS in disaster management

- Capacity building for disaster/damage mitigation (structural and non-structural measures).
- Disaster risk reduction strategies and National Disaster Management Guidelines
- Disaster Management Act-2005
- Regional issues as per regional requirement/ university can take minimum two topics as per High Powered Committee.

UNIT- V **9 Hrs**

Practical exposure requirements: Field work/ community visit and Vulnerability Mapping, Safe community planning and implementation, Mock Drill/ Regional issues as per region/university

Course Outcomes:

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

1. Define and analysis factors contributing to disasters, threats to development, life and nature
2. Demonstrate, and practice disaster risk reduction activities towards sustainable development
3. Formulate, organize and assess disaster risk reduction
4. Plan activities according to the nature of disasters and factors of vulnerabilities
5. Able to mitigate disaster and educate communities

Mode of Evaluation: Continuous Assessment Test, Quizzes, Assignments, Multiple choice questions test, field work report, project report.

Textbooks:

1. “Disaster Management” by Harsh K. Gupta
2. “Disaster Management: Future Challenges and Opportunities” by Jagbir Singh

Reference Books:

1. Singh, R. (2017), "Disaster Management Guidelines for Earthquakes, Landslides, Avalanches and Tsunami". Horizon Press Publications
2. Taimpo (2016), "Disaster Management and Preparedness" CRC Press Publications
3. Nidhi, G.D. (2014), "Disaster Management Preparedness". CBS Publications Pvt. Ltd.

4. Gupta, A. K., Nair, S.S., Shiraz, A. and Dey, S.(2013), "Flood Disaster Risk Management- CBS Publications Pvt. Ltd.
5. Singh, R. (2016), "Disaster Management Guidelines for Natural Disasters" Oxford University Press Pvt. Ltd.

2nd YEAR: III SEMESTER
UNIVERSITY ELECTIVE – III

TAUT2201C HUMAN VALUES & PROFESSIONAL ETHICS L T P C
3 0 0 3

Course Description:

The Human Values and Professional Ethics course aims to explore the fundamental principles that underpin ethical behaviour and moral reasoning. This course provides students with an understanding of core human values and ethical frameworks, fostering the development of personal integrity, social responsibility, and professional ethics. Through this course, students will engage with key philosophical theories, contemporary ethical issues, and the application of ethical principles in various contexts.

Course Objectives:

1. Understand the need, guidelines, content, and process for Value Education.
2. Understand the concept of harmony within oneself.
3. Understand the values in human relationships.
4. Understand the interconnectedness and mutual fulfillment among the four orders of nature.
5. Understand the implications of a holistic understanding of harmony on professional ethics.

UNIT-I **9 Hrs**

Introduction – Need, guidelines, content and process for Value Education Value Education

- Understanding the need, basic guidelines, content and process for Value Education
- Self-exploration what is it? Its content and process; "Natural acceptance" and Experiential Validation as the mechanism for self-exploration.

UNIT-II **9 Hrs**

Understanding harmony in the human being- Harmony in myself!

- Understanding human being as a coexistence of the sentient I and the material body
- Understanding the harmony of I with the body: Sanyam and Swasthya; correct appraisal of physical needs, meaning of prosperity in detail.

UNIT-III **9 Hrs**

Understanding harmony in the Family and Society- Harmony in Human relationship

- Understanding values in human –
- Human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay- trupti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship
- Visualizing a universal harmonious order in society-Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha) from family to world family.

UNIT-IV **9 Hrs**

Understanding Harmony in Nature; Coexistence

- Interconnectedness and mutual fulfillment among the four orders of nature-recyclability and self-regulation in nature.
- Holistic perception of harmony at all levels of existence.

UNIT-V **9 Hrs**

Implications of the above Holistic understanding of harmony on professional ethics

- Definitiveness of Ethical Human Conduct
- Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order
- Competence in professional ethics
- Ability to utilize the professional competence for augmenting universal human order

Course Outcomes:

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

1. Students will be able to explain the need, guidelines, content, and process for Value Education.
2. Students will demonstrate an understanding of the harmony within oneself, identifying the sentient self and the material body.
3. They will be capable of visualizing and explaining the concept of a universal harmonious order from the family level to the global level.
4. They will recognize and explain the importance of recyclability and self-regulation in nature and develop a holistic view of harmony at all levels of existence.
5. They will be able to define and advocate for ethical human conduct in their professional lives.

Textbooks:

1. "Value Education and Professional Ethics" by R.S. Naagarazan
2. "Human Values and Professional Ethics" by Rishabh Anand

Reference Books:

1. Mind and Body: Holistic Approach"by Dr. V.K. Sharma
2. "Integrative Body-Mind Training"** by Yi-Yuan Tang
3. Understanding Harmony in the Family and Society
4. "Human Values and Professional Ethics"** by Jayashree Suresh
5. "Ethics in Engineering Practice and Research"** by Caroline Whitbeck

2nd YEAR: III SEMESTER
UNIVERSITY ELECTIVE – III

TAUT2201D INFECTION PREVENTION AND CONTROL L T P C
3 0 0 3

Course Description:
This course covers infection control principles, antibiotic resistance, and antimicrobial stewardship. Students will learn about sterilization, disinfection, hand hygiene, PPE, and managing drug resistance in healthcare settings.

Course Objectives:
Students undergoing this course are expected to:

1. Understand evidence-based infection control practices.
2. Learn prevention and control of healthcare-associated infections.
3. Analyse the history and mechanisms of antibiotic resistance.
4. Examine trends and actions to combat drug resistance.
5. Implement antimicrobial stewardship in hospitals.

UNIT-I **9 Hrs**
Evidence-based infection control principles and practices: Sterilization, Disinfection, Effective hand hygiene, Use of Personal Protective Equipment (PPE).

UNIT-II **9 Hrs**
Infection control: Prevention & control of common healthcare-associated infections, Components of an effective infection control program, Guidelines (NABH and JCI) for Hospital Infection Control.

UNIT-III **9 Hrs**
Antibiotics: Antibiotic Resistance, History of antibiotics, How resistance happens and spreads, Types of resistance- intrinsic, acquired, passive.

UNIT-IV **9 Hrs**
Drug resistance: Trends in drug resistance, Actions to fight resistance, Bacterial persistence, Antibiotic sensitivity.

UNIT-V **9 Hrs**
Consequences of antibiotic resistance, Antimicrobial Stewardship – Barriers and opportunities, tools and models in hospitals

Course Outcomes:
At the end of this course, students should be able to:

1. Apply effective infection control practices.
2. Prevent and manage healthcare-associated infections.
3. Explain the history and spread of antibiotic resistance.

4. Identify and combat drug resistance trends.
5. Implement antimicrobial stewardship strategies.

Textbooks:

1. "Infection Prevention and Control: Theory and Practice for Healthcare Professionals" by Debbie Weston
2. "Antibiotics: Actions, Origins, Resistance" by Christopher Walsh

Reference Books:

1. "Antimicrobial Stewardship: Principles and Practice" by Matthew Laundy, Lynda A. Sisson, and Matthew Dryden

2nd YEAR: III SEMESTER
UNIVERSITY ELECTIVE - III

TAUT2201E **NSS & YOUTH DEVELOPMENT** **L T P C**
3 0 0 3

Course Description:

The National Service Scheme (NSS) aims to develop students' personalities through community service and national integration. It encourages students to work towards societal development, fostering a sense of responsibility and civic duty. The program bridges academic learning and real-life experiences, promoting overall personal growth and social awareness among youth.

Course Objectives:

1. To explain the nature, functions and importance of NSS.
2. To explain the role of NSS in the context of youth, community and voluntary service.
3. To develop the necessary communication and soft skills.
4. To appreciate the importance of health, hygiene and sanitation for a healthy nation.
5. To develop the concept and skills of managing environment issues and disaster management.

UNIT-I **9 Hrs**

Youth Development Program in India and Role of Youth Leaders National Youth Policy; Youth Development Program at National Level, State Level, Volunteer Level; Youth centric and youth led organizations Role and Importance of youth leadership, Leadership capability and its development.

UNIT-II **9 Hrs**

Meaning type of leader, Qualities, Traits, Role, Importance of a Good Leader Social, psychologic factors affecting the youth.

Life Skills-Self-awareness, Empathy, Effective Communication, Decision Making; Role of Music and Art in Youth Development.

UNIT-III **9 Hrs**

Basic Features of the Indian Constitution consumer protection act right to Information; Child Protection Act, Problems of Aging: Problems Protection of Interests.

UNIT-IV **9 Hrs**

Side effects of modern lifestyle and their countermeasures Diet, exercise, sleep in Indian lifestyle; Collection, Utilization and Camp; Management of Camps; Biography of Swami Vivekananda.

UNIT-V **9 Hrs**

Field Work - Rural visit- campaign- rally- Competitions.

Course Outcomes:

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

1. Explain the role and functions of NSS.
2. Appraise the role of NSS volunteers in developing the society as a whole.
3. Develop the necessary skills of effective communication, leadership and healthy living.
4. Develop the necessary skills to mitigate disasters and other environmental challenges.
5. Develop consciousness about personal health and hygiene.

Textbooks:

1. Communication Skills by N Rao & R P Das (HPH)
2. Biodiversity, Environment & Disaster Management by Shamna Hussain (Unique Publishers)

Reference Books:

1. NSS Manual published by the Ministry of Youth Affairs & Sports, Govt. of India
2. National Youth Policy Document
3. National Service Scheme - A Youth Volunteers Programme For Under Graduate Students as Per UGC Guidelines by J D S Panwar, A K Jain & B K Rathi (Astral)
4. Environmental Studies by P K Pandey (Mahaveer Publications)

4th Semester						
Course Code	**Course Name**	**Periods per week**			**Credits**	**Hours per week**
		L	**T**	**P**		
RDTT2504	Applied Pathology and Microbiology related to Renal Dialysis Technology	3	1	0	4	4
RDTT2505	Nutrition in Renal Disease	3	1	0	4	4
RDTT2506	Instrumentation in Renal Dialysis Technology	3	1	0	4	4
RDTL2502	Clinical skills II	0	0	20	10	20
--	Seminar	0	0	0	0	1
--	Library	0	0	0	0	1
--	Extra-curricular activities	0	0	0	0	1
	Mentoring	0	0	0	0	1
	Total	**9**	**3**	**10**	**22**	**36**

2nd YEAR: IV SEMESTER

		L	T	P	C
RDTT2504	**Applied Pathology and Microbiology related to Renal Dialysis Technology Paper-1**	**3**	**1**	**0**	**4**

Course Description:

This course provides an extensive overview of renal diseases, including inherited and congenital abnormalities, vascular disorders, and the impact of conditions like diabetes and hypertension. It covers dialysis-induced changes, urinary tract obstructions, and infections. Applied microbiology relevant to renal dialysis technology is also discussed, emphasizing prevention and management of infections.

Course Objective:

Students undergoing this course are expected to:

1. To understand the classification and pathology of various renal diseases, including inherited and congenital abnormalities.
2. To learn about renal vascular disorders, end-stage renal diseases, and the pathology of the kidney in hypertension.
3. To comprehend the impact of systemic conditions like diabetes mellitus and pregnancy on kidney health.
4. To recognize the pathological changes induced by dialysis and urinary tract obstructions.
5. To gain knowledge in applied microbiology relevant to renal dialysis, including infections, universal precautions, and sampling methodologies.

Unit 1 Renal Anatomy and Disease Classification 12 hrs

- Inherited and Congenital abnormalities of the urinary system,
- Classification of renal diseases,
- Glomerular diseases: causes, types & pathology, Tubulointerstitial diseases

Unit 2 Renal Vascular and End-Stage Pathologies 12 hrs

- Renal vascular disorders,
- End-stage renal diseases: causes & pathology,
- Pathology of kidney in hypertension,
- Renal neoplasia

Unit 3 Systemic Conditions Affecting Renal Health 12 hrs

- Diabetes mellitus,
- Diabetic nephropathy,
- Nephrolithiasis.
- Pregnancy and kidney disease,

- Pathology of the peritoneum,
- peritonitis,
- bacterial, tubular & sclerosing peritonitis,

Unit 4 Dialysis-Induced and Urinary Tract Pathologies 12 hrs

- Dialysis-induced changes,
- Urinary tract obstructions
- Pathology of urinary tract infection,
- Pyelonephritis , tuberculous pyelonephritis ,Reflux nephropathy

Unit 5 Applied Microbiology related to Renal Dialysis technology 12 hrs

- Hepatotropic viruses in detail: mode of transmission,
- Universal precautions
- vaccinations,
- Human immunodeficiency virus (HIV),
- Mode of transmission,
- Universal precautions,
- Opportunistic infections,
- Microbiology of urinary tract infections,
- Microbiology of vascular access infection (femoral, jugular, subclavian catheters),
- Sampling methodologies for culture & sensitivity.

Course learning outcomes:

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

1. Identify and Classify Renal and Urinary Abnormalities
2. Understand Pathology of Renal Vascular Disorders and End-Stage Renal Diseases
3. Analyze Systemic Conditions and Their Impact on Kidneys
4. Manage Dialysis-Induced Changes and Urinary Tract Issues
5. Apply Microbiological Knowledge in Renal Dialysis Technology

Textbooks

1. Heptinstall's Pathology of the Kidney
2. Textbook of Nephrology
3. Diagnostic Atlas of Renal Pathology
4. Handbook of Applied Therapeutics for Kidney Diseases

Reference Books

1. Comprehensive Clinical Nephrology
2. Oxford Handbook of Nephrology and Hypertension
3. Principles of Nephrology
4. Renal Pathophysiology: The Essentials

2nd YEAR: IV SEMESTER

		L	T	P	C
RDTT2505	**Nutrition in Renal Dialysis**				
	Paper-2	**3**	**1**	**0**	**4**

Course Description:

This course covers essential aspects of nutrition for dialysis patients, including macronutrients, micronutrients, and nutrient therapy. It addresses nutritional assessments, malnutrition management, and diet plans for chronic kidney disease (CKD) and acute kidney injury (AKI). Special emphasis is placed on pediatric nutrition management and dietary modifications to improve chronic complications.

Course Objective:

Students undergoing this course are expected to:

1. To understand the basics of nutrition, including macronutrients and micronutrients, and their importance in dialysis patients.
2. To learn the components of nutrition, including sources, daily recommended intake, and functions.
3. To recognize and manage malnutrition in dialysis patients, including pediatric cases and home dialysis patients.
4. To comprehend the significance of diet in chronic kidney disease (CKD) across different stages and dialysis modalities.
5. To develop diet plans for patients with acute kidney injury (AKI) and understand the role of diet in their recovery.

Unit 1 **Introduction to Renal Nutrition** **12 hrs**

- Nutrition and nutrients, Macronutrients, and micronutrients.
- Purpose of nutrient therapy in dialysis patients
- Assessments to measure nutritional status in dialysis patients

Unit 2 **Components of nutrition** **12 hrs**

- Components of nutrition: Source, daily recommended intake, Functions, low/high intake.

Unit 3 **Malnutrition** **12 hrs**

- Definition, types, causes, protein, energy-wasting, prevention and management of malnutrition, Nutrition, and diet for home dialysis patients.
- Nutrition Management in Pediatrics
- Importance of nutrition management in pediatric dialysis.
- Measures to improve chronic complications by diet modification

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Unit 4 **Diet in CKD** **12 hrs**

- Importance of diet in CKD
- Diet for CKD (Stage1-stage 4)
- Diet for patients in HD and CAPD

Unit 5 **Diet in AKI** **12 hrs**

- Importance of Diet in AKI Patients
- Diet plan in AKI patients

Course learning outcomes:

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

1. Understand Nutrition Basics and Nutrient Therapy for Dialysis Patients
2. Identify and Utilize Components of Nutrition
3. Define and Manage Malnutrition
4. Implement Dietary Management for Chronic Kidney Disease (CKD)
5. Formulate Diet Plans for Acute Kidney Injury (AKI) Patients

Textbooks

1. Nutrition in Kidney Disease by Laura D. Byham-Gray, Jerrilynn D. Burrowes, and Glenn M. Chertow
2. The Science and Practice of Nutrition Support: A Case-Based Core Curriculum by Jon K. Polson and Kristen M. Roberts
3. Clinical Guide to Nutrition Care in Kidney Disease by Laura Byham-Gray, Jerrilynn Burrowes, and Glenn Chertow
4. Dietary Management of Chronic Kidney Disease by Areej M. Eshaq

Reference Books

1. Handbook of Nutrition and the Kidney by William E. Mitch and T. Alp Ikizler
2. Nutrition Therapy for Chronic Kidney Disease by Judith A. Beto
3. Essentials of Nutrition and Diet Therapy by Sue Rodwell Williams
4. Krause's Food & the Nutrition Care Process by L. Kathleen Mahan, Janice L. Raymond, and Sylvia Escott-Stump

2nd YEAR: IV SEMESTER

		L	T	P	C
RDTT2506	**Instrumentation in Renal Dialysis technology**				
	Paper-3	**3**	**1**	**0**	**4**

Course Description:

This course provides an in-depth understanding of hemodialysis machines, including their components, functions, and alarms. It covers the principles of dialysis-related electronics, water treatment systems, and maintenance. The course also explores various instruments used in dialysis units, such as blood pressure monitors, thermometers, and defibrillators.

Course Objective:

Students undergoing this course are expected to:

1. To understand the components and functionalities of hemodialysis machines.
2. To learn the functions of dialysis machines, including dialysate delivery and ultrafiltration control.
3. To comprehend the basics of electricity, conductivity, and electronic components related to dialysis.
4. To know the components and maintenance of the water treatment system in a hemodialysis unit.
5. To become familiar with other essential instruments in the dialysis unit and their functions.

Unit 1 **Description of Haemodialysis machines** **12 hrs**

a. Blood part components
b. Fluid part components
c. Rear Components
d. Indication light and Buttons
e. The Screen Overview.
f. Alarms in HD machine

Unit 2 **Dialysis Machine Functions** **12 hrs**

a. Dialysate delivery
b. Deaeration
c. Blood leak detector
d. Bypass function
e. Ultrafiltration control
f. Volumetric ultrafiltration-controlled machine
g. Flowmetric-controlled ultrafiltration system
h. Peritoneal dialysis machine
   - Components
   - Alarms

Unit 3 **Dialysis and electronics** **12 hrs**

a. Electricity
b. Conductivity
c. Electrical leakage
d. Isolation transformers
e. Electronic components

Unit 4 **Water treatment system** **12 hrs**

a. Components of the water treatment system
   - Sand filter and its principle
   - Carbon filter and its principle
   - Softener and its principle
   - Reverse osmosis membrane and its principles
   - UV radiation and its application
b. Maintenance of the Water treatment plant in the hemodialysis unit.
c. Portable RO

Unit 5 **Other Instruments in Dialysis Unit** **12 hrs**

a. Blood pressure monitoring systems and their functioning.
b. Thermometers (Digital and manual)
c. Dialyzer reprocessing machines and their functions.
d. Fumigation Gun
e. UV lamps for surface disinfection
f. Defibrillator and AED and its settings.
g. Hepa filters and their Use

Course learning outcomes:

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

1. Describe the Components and Functions of Hemodialysis Machines
2. Understand the Key Functions of Dialysis Machines
3. Apply Electrical and Electronic Principles in Dialysis
4. Maintain and Operate Water Treatment Systems for Dialysis
5. Utilize and Maintain Additional Instruments in Dialysis Units

Textbooks:

1. Pharmacology for Dental & Allied Health Sciences, Padmaja Udayakumar.
2. Oxford Handbook of dialysis-2nd edition-Jeremy Levy, Julie Morgan, Edwina Brown
3. Renal Nursing – by Nicola Thomas
4. Principles and Practice of Dialysis – by William L Henrich, MD

Referenes:

1. Review of Haemodialysis for Nurses and Dialysis Personnel – by Judith Z Kallenbach
2. Indian Journal of Nephrology-Indian Society of Nephrology Guidelines for Haemodialysis Unit
3. Replacement of Renal Function by Dialysis – Edited by J.F Maher

2nd YEAR: IV SEMESTER

		L	T	P	C
RDTL2502	**Clinical Skills 2**				
	Practical/Training Paper- 1	**0**	**0**	**20**	**10**

Course Description:

This course offers comprehensive training on setting up and maintaining dialysis machines, preparing dialysates, and performing safety tests and priming. It covers disinfection, sterilization, reuse of dialysis apparatus, automated peritoneal dialysis equipment, and obstructive nephropathies. Additionally, it addresses the components and roles of personnel within a dialysis center for effective patient care.

Course Objective:

Students undergoing this course are expected to:

1. To learn how to set up and perform daily maintenance of dialysis machines.
2. To understand the preparation and use of dialysis concentrates, including acetate and bicarbonate dialysate.
3. To know the procedures for disinfection, sterilization, and reuse of dialysis apparatus.
4. To set up and operate automated peritoneal dialysis equipment.
5. To comprehend the components and roles within a dialysis center, including inpatient and outpatient dialysis.

Unit 1 **Preparation of the Haemodialysis machine** **60 hrs**

a. Setting up a dialysis machine for dialysis
b. Daily maintenance of dialysis machine
c. Consumables needed for hemodialysis
d. Safety tests before initiating priming.
e. Priming of the extracorporeal circuit.

Unit 2 **Dialysis Concentrate** **60 hrs**

a. Dialysis Concentrate
b. Acetate and Bicarbonate dialysate
c. Preparation of Dialysate.

Unit 3 **Disinfection and Sterilization** **60 hrs**

a. Disinfection and sterilization in dialysis centre
b. Reuse of dialysis apparatus

Unit 4 **Peritoneal dialysis in Practice** **60 hrs**

a. Setting up of automated peritoneal dialysis equipment
b. Procedure of CAPD

Unit 5 Other Professionals in Haemodialysis Centre 60 hrs

a. Components of a Dialysis Centre
b. Inpatient dialysis, Outpatient dialysis
c. Role of other personnel in the dialysis centre as a team

Course learning outcomes:

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

1. Set Up and Maintain Dialysis Machines
2. Prepare Dialysis Concentrates and Dialysate
3. Implement Disinfection and Sterilization Protocols
4. Manage Automated Peritoneal Dialysis Equipment and Nephropathies
5. Understand the Operations and Team Roles in a Dialysis Centre

Textbooks:

1. Oxford Handbook of dialysis-2nd edition-Jeremy Levy, Julie Morgan, Edwina Brown
2. Renal Nursing – by Nicola Thomas
3. Principles and Practice of Dialysis – by William L Henrich, MD

References:

1. Review of Haemodialysis for Nurses and Dialysis Personnel – by Judith Z Kallenbach
2. Indian Journal of Nephrology-Indian Society of Nephrology Guidelines for Haemodialysis Unit
3. Replacement of Renal Function by Dialysis – Edited by J.F Maher

5th Semester						
Course Code	**Course Name**	**Periods per week**			**Credits**	**Hours per week**
		L	**T**	**P**		
RDTT3501	Applied techniques in dialysis	3	1	0	4	4
RDTT3502	Applied Dialysis Therapy	3	1	0	4	4
RDTT3503	Advanced extracorporeal therapies	3	1	0	4	4
RDTL3501	Clinical skills III	0	0	16	8	16
RDTT3601a RDTT3601b RDTT3601c	Programme electives 1 1. Basics of clinical skills learning. 2. Hospital operation management 3. Biomedical Instruments in Dialysis	3	0	0	3	3
--	Seminar	0	0	0	0	1
--	Library	0	0	0	0	1
--	Extra-curricular activities	0	0	0	0	2
	Mentoring	0	0	0	0	1
	Total	**12**	**3**	**16**	**23**	**36**

3rd YEAR: V SEMESTER

		L	T	P	C
RDTT3501	**Applied Techniques in Dialysis Paper-1**	**3**	**1**	**0**	**4**

Course Description:

This course explores dialysis in special situations, including patients with cardiac failure, liver disease, HIV, failed transplants, poisoning, and pregnancy. It covers dialysis for infants and children, patient care, and complications. The course also addresses special dialysis procedures, vascular access for hemodialysis, and peritoneal access devices, focusing on types, techniques, and complications.

Course Objective:

Students undergoing this course are expected to:

4. To understand dialysis procedures for patients in special situations such as cardiac failure, liver disease, and pregnancy.
5. To learn about dialysis care and complications in infants, children, and adults.
6. To comprehend various special dialysis procedures, including hemodiafiltration, hemoperfusion, and plasmapheresis.
7. To gain knowledge of vascular access types, preparation, evaluation, and cannulation for hemodialysis.
8. To understand the types, insertion techniques, and complications of peritoneal access devices.

Unit 1 **Dialysis in special situations** **12 hrs**

- Patients with congestive cardiac failure.
- Advanced liver disease.
- Patients positive for HIV, HBsAg & HCV.
- Failed transplant.
- Poisoning cases.
- Pregnancy.

Unit 2 **Patient care and complications** **12 hrs**

- Dialysis in infants & children.
- Patient care in dialysis procedures.
- Short-term and long-term complications of Dialysis.

Unit 3 **Special dialysis procedures** **12 hrs**

- Continuous therapies in hemodialysis.
- Different modalities of peritoneal dialysis.
- Hemodiafiltration.
- Hemoperfusion.
- SLED.
- MARS.
- Plasmapheresis

Unit 4 Vascular access for hemodialysis & associated complications 12 hrs

- Types of Access
- Access preparation
- Evaluation
- AVG/AVF cannulation

Unit 5 Peritoneal Access devices 12 hrs

- Types of Catheters
- Insertion techniques
- Complications

Course learning outcomes:

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

1. Manage Dialysis in Special Situations
2. Provide Dialysis for Infants and Children and Ensure Comprehensive Patient Care
3. Implement Special Dialysis Procedures
4. Handle Vascular Access for Hemodialysis and Associated Complications
5. Manage Peritoneal Access Devices

Textbooks:

1. Oxford Handbook of dialysis-2nd edition-Jeremy Levy, Julie Morgan, Edwina Brown
2. Principles and Practice of Dialysis – by William L Henrich, MD

References Books:

1. Review of Haemodialysis for Nurses and Dialysis Personnel – by Judith Z Kallenbach
2. Indian Journal of Nephrology-Indian Society of Nephrology Guidelines for Haemodialysis Unit
3. Replacement of Renal Function by Dialysis – Edited by J.F Maher

3rd YEAR: V SEMESTER

		L	T	P	C
RDTT3502	**Applied Dialysis Therapy**				
	Paper 2	**3**	**1**	**0**	**4**

Course Description:

This course addresses the special problems faced by dialysis patients, including psychological issues, diabetes, hypertension, infections, and bone diseases. It covers renal anemia management, blood-related complications, and patient-related complications in hemodialysis. The course provides strategies for the prevention and treatment of these complications to ensure effective patient care.

Course Objective:

Students undergoing this course are expected to:

1. To understand special problems faced by dialysis patients, including psychological, diabetic, hypertensive, and bone-related issues.
2. To learn about the causes and treatment of renal anemia in chronic dialysis patients.
3. To recognize and manage blood-related complications in hemodialysis.
4. To identify and manage the most common patient-related complications during hemodialysis.
5. To understand and manage less common patient-related complications in hemodialysis.

Unit 1 Special problems in dialysis patients 12 hrs

- Psychology & rehabilitation.
- Diabetes
- Hypertension.
- Infections.
- Bone diseases.
- Aluminum toxicity.

Unit 2 Renal Anemia Management in Chronic Dialysis 12 hrs

- Causes of Anemia in Renal Failure
- Treatment

Unit 3 Blood-related complications in Haemodialysis 12 hrs

- Air in Blood (Causes, Signs and symptoms, prevention, treatment)
- Air embolism (Causes, Signs and symptoms, prevention, treatment)
- Blood loss (Causes, Signs and symptoms, prevention, treatment)
- Access recirculation (Causes, Signs and symptoms, prevention, treatment)
- Clotting in the extracorporeal circuit (Causes, Signs and symptoms, prevention, treatment)
- Poor Blood flow (Causes, Signs and symptoms, prevention, treatment)
- Needle infiltration (Causes, Signs and symptoms, prevention, treatment)

Unit 4 Common Patient-Related Complications in Haemodialysis 12 hrs

- Patient-related most common complications and their management in Hemodialysis
- Hypotension (Etiology, signs and symptoms, prevention)
- Hypertension (Etiology, signs and symptoms, prevention)
- Muscle cramps (Etiology, signs and symptoms, prevention)
- Nausea/Vomiting (Etiology, signs and symptoms, prevention)
- Headache (Etiology, signs and symptoms, prevention)
- Angina (Etiology, signs and symptoms, prevention)
- Pruritis (Etiology, signs and symptoms, prevention)
- Fever and Chills (Etiology, signs and symptoms, prevention)

Unit 5 Less Common Patient-Related Complications in Haemodialysis 12 hrs

Patient-related other less common complications and their management in Hemodialysis

- DDS (Etiology, signs and symptoms, prevention)
- First use syndrome(Etiology, signs and symptoms, prevention)
- Anaphylaxis (Etiology, signs and symptoms, prevention)
- Dysrhythmia (Etiology, signs and symptoms, prevention)
- Dialysis Associated pericarditis, pericardial effusion and cardiac tamponade

Course learning outcomes:

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

1. Address Special Problems in Dialysis Patients
2. Manage Renal Anemia in Chronic Dialysis
3. Handle Blood-Related Complications in Hemodialysis
4. Manage Common Patient-Related Complications in Hemodialysis
5. Manage Less Common Patient-Related Complications in Hemodialysis

Textbooks

1. Handbook of Dialysis by John T. Daugirdas, Peter G. Blake, and Todd S. Ing
2. Principles and Practice of Dialysis by William L. Henrich
3. Clinical Dialysis by Allen R. Nissenson and Richard E. Fine
4. Dialysis Therapy by Allen R. Nissenson and Richard N. Fine

Reference Books

1. Core Curriculum for Nephrology Nursing by Caroline S. Counts
2. Handbook of Chronic Kidney Disease Management by John T. Daugirdas and Jean L. Holley
3. Nephrology and Hypertension Board Review by Phuong-Chi Pham and Phuong-Thu Pham
4. Oxford Handbook of Dialysis by Jeremy Levy, Edwina Brown, and Anastasia Lawrence

3rd YEAR: V SEMESTER

		L	T	P	C
RDTT3503	**Advanced extracorporeal therapies**				
	Paper 3	**3**	**1**	**0**	**4**

Course Description:

This course provides an overview of continuous renal replacement therapy (CRRT) and various CRRT machines. It covers different CRRT modalities, hemoperfusion, plasmapheresis, and liver dialysis. The course emphasizes indications, principles, complications, and the preparation of apparatus for these specialized dialysis procedures.

Course Objective:

Students undergoing this course are expected to:

1. To understand the different CRRT machines and their functionalities.
2. To learn about the various CRRT modalities and related terminologies.
3. To comprehend the principles, indications, and complications of hemoperfusion.
4. To gain knowledge of the principles, indications, and complications of plasmapheresis.
5. To understand the principles, indications, and complications of liver dialysis.

Unit 1 Introduction to CRRT and different CRRT machines 12 hrs

- Bbraun Diapact CRRT machine
- Prisma flex

Unit 2 CRRT modalities 12 hrs

- CVVH
- CVVHD
- CVVHDF
- Alarms and management in CRRT
- Terminologies related CRRT

Unit 3 Hemoperfusion 12 hrs

- Indication
- Principles
- Complications
- Hemoperfusion apparatus and its preparation

Unit 4 Plasmapheresis 12 hrs

- Indication.
- Principles
- Complications
- Efficiency
- Plasmapheresis apparatus and its preparation

Unit 5 **Liver dialysis** **12 hrs**

- Indication.
- Principles
- Complications
- Efficiency
- Liver apparatus and its preparation

Course learning outcomes:

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

1. Understand CRRT and CRRT Machines
2. Master CRRT Modalities and Management
3. Apply Hemoperfusion Techniques
4. Conduct Plasmapheresis Procedures
5. Perform Liver Dialysis

Textbooks:

1. Oxford Handbook of dialysis-2nd edition-Jeremy Levy, Julie Morgan, Edwina Brown
2. Principles and Practice of Dialysis – by William L Henrich, MD

References:

1. Review of Haemodialysis for Nurses and Dialysis Personnel – by Judith Z Kallenbach
2. Indian Journal of Nephrology-Indian Society of Nephrology Guidelines for Haemodialysis Unit
3. Replacement of Renal Function by Dialysis – Edited by J.F Maher

3rd YEAR: V SEMESTER

		L	T	P	C
RDTL3501	**Clinical Skills 3**				
	Practical/Training Paper	**0**	**0**	**16**	**8**

Course Description:

This course provides practical training on cannulation techniques, dialysis machines, and daily maintenance of a dialysis center. It includes minor procedures, patient file management, and CPR demonstration for managing cardiac arrests in dialysis centers. The course also covers the components and roles within a dialysis center, emphasizing teamwork and quality control.

Course Objective:

Students undergoing this course are expected to:

1. To learn the techniques of cannulation for arteries, veins, and AV fistula/grafts.
2. To understand the maintenance and allocation of different dialysis machines in a dialysis center.
3. To assist in minor procedures and manage patient files effectively in the dialysis center.
4. To perform CPR and manage cardiac arrest situations in a hemodialysis center.
5. To comprehend the components, roles, and workflows within a dialysis center, including a visit to the Central Sterile Supply Department (CSSD).

Unit 1 Cannulation and Ultrafiltration 48 hrs

a. Cannulation of arteries and veins
b. A v fistula/a v graft cannulation.
c. Isolated ultrafiltration

Unit 2 Dialysis Machines and Center Maintenance sis 48 hrs

a. Different dialysis machines in dialysis center,
b. Daily maintenance of dialysis center,
c. Criteria for allotting dialysis machine to a patient

Unit 3 Minor Procedures and Patient File Management 48 hrs

a. Minor procedures in Hemodialysis
b. Assisting Minor procedures in dialysis center
c. patient files (Inpatient files as well as outpatient files),
d. Use of medical records number(MRD NO)

Unit 4 CPR and Cardiac Arrest Management in Haemodialysis 48 hrs

a. CPR and its demonstration
b. How to manage a cardiac arrest in a Hemodialysis centre.

Unit 5 Components and Roles in a Dialysis Center 48 hrs

a. Components of a Dialysis Centre
b. Inpatient dialysis, Outpatient dialysis
c. Role of other personals in dialysis center as a team,
d. Visit to the Central sterile supply department of the hospital, to observe the workflow of CSSD, quality controls used.

Course learning outcomes:

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

1. Perform Cannulation and Ultrafiltration Procedures
2. Manage Dialysis Machines and Center Maintenance
3. Assist and Conduct Minor Hemodialysis Procedures
4. Respond to Emergencies and Perform CPR
5. Understand Dialysis Center Operations and Team Roles

Textbooks

1. Handbook of Dialysis by John T. Daugirdas, Peter G. Blake, and Todd S. Ing
2. Principles and Practice of Dialysis by William L. Henrich
3. Clinical Dialysis by Allen R. Nissenson and Richard E. Fine
4. Dialysis: History, Development and Promise by Todd S. Ing, Mohamed Rahman, and Carl M. Kjellstrand

Reference Books

1. Core Curriculum for Nephrology Nursing by Caroline S. Counts
2. Handbook of Chronic Kidney Disease Management by John T. Daugirdas and Jean L. Holley
3. Oxford Handbook of Dialysis by Jeremy Levy, Edwina Brown, and Anastasia Lawrence
4. Nephrology Nursing Scope and Standards of Practice by American Nephrology Nurses Association

3rd YEAR: V SEMESTER

		L	T	P	C
RDTL3601a	**BASICS OF CLINICAL SKILLS LEARNING**				
	Programme elective 1	**3**	**0**	**0**	**3**

Course Description:

This course covers essential skills in measuring vital signs, performing physical examinations, and caring for vascular access. It includes training in drug administration, asepsis techniques, and ensuring dialysis adequacy. Additionally, it emphasizes patient mobility, support, and the application of protective measures to maintain a sterile environment.

Course Objective:

Students undergoing this course are expected to:

1. To learn the techniques for measuring vital signs, including temperature, pulse, respiratory rate, blood pressure, and pain assessment.
2. To understand the methods of physical examination, including observation, auscultation, palpation, percussion, and history taking.
3. To provide proper care for vascular access, including AVF/AVG and catheters, and perform microbiological sampling.
4. To administer medications and therapies effectively, including oral, intravenous, intramuscular, subcutaneous, and oxygen therapy.
5. To practice asepsis techniques, ensure the adequacy of dialysis, and assist in patient mobility and support activities.

Unit 1 **MEASURING VITAL SIGNS** **9 hrs**

Temperature: Axillaries Temperature, Pulse: Sites of pulse, Measurement, Respiratory, Blood Pressure, Pain: Pain Scale

Unit 2 **Assessment of the patient** **9 hrs**

Observation, Auscultation (Chest), Palpation, Percussion, History Taking

Unit 3 Care Vascular Access **9 hrs**

- AVF/AVG
- Cuffed and non -cuffed catheter
- Placement of External Vascular access
- Microbiological sampling of Vascular access.

Unit 4 **Drug Administration and Therapy** **9 hrs**

ADMINISTRATIONS: Oral, Intravenous, Intramuscular, Subcutaneous, Loading of Drugs(Heparin, Protamine sulfate), Calculation of Drugs(Heparin, Protamine sulfate), Venipuncture, IV Infusion, Cannula, Attachment of IV infusion Set, Fluid Collection, Heparin Lock, Maintenance of IV set,

Performing Nebulizer Therapy, Oxygen Therapy (Nasal, prongs, nasal Catheter, Venturi Mask, face mask)

Unit 5 **Quality and patient safety** **9 hrs**

- **ASEPSIS:** Hand wash Techniques, (Medical, Surgical) Universal Precaution, Protecting Equipment: Using Sterile Gloves, Opening a Sterile package, and Establishing a Sterile Field, Sterile Dressing Changes, Surgical Attire, Wound Dressing, Suture Removal, Cleaning and Application of Sterile Dressing, Wearing and Removal of personal protective Equipment.
- **Adequacy of Hemodialysis and Peritoneal dialysis:** URR, Kt/v, Recirculation
- **MOBILITY AND SUPPORT:** Moving and Positioning, range of Motion exercises (Active & Passive) Assisting for Transfer, Application of Restraints

Course learning outcomes:

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

1. Measure and Interpret Vital Signs
2. Conduct Comprehensive Physical Examinations
3. Manage and Care for Vascular Access
4. Administer Medications and Therapies
5. Maintain Asepsis and Support Patient Mobility

Textbooks:

1. Oxford Handbook of dialysis-2nd edition-Jeremy Levy, Julie Morgan, Edwina Brown
2. Principles and Practice of Dialysis – by William L Henrich, MD

References Books:

1. Review of Hemodialysis for Nurses and Dialysis Personnel – by Judith Z Kallenbach
2. Indian Journal of Nephrology-Indian Society of Nephrology Guidelines for Hemodialysis Unit
3. Replacement of Renal Function by Dialysis – Edited by J.F Maher

3rd YEAR: V SEMESTER

	HOSPITAL OPERATIONS MANAGEMENT	L	T	P	C
RDTL3601b	**Programme elective 1**	**3**	**0**	**0**	**3**

Course Description:

This course provides a comprehensive understanding of hospital operations, focusing on medico-legal case management, ethical considerations, hospital information systems, equipment operations management, and the importance of medical records in healthcare management. It prepares students for the administrative and operational challenges faced in modern healthcare environments.

Course Objectives:

Students undergoing this course are expected to:

1. Understand medico-legal issues and laws relevant to healthcare operations.
2. Analyze ethical considerations such as consent, confidentiality, mental health, and clinical trials.
3. Gain knowledge of Hospital Information Systems (HIS) and their software applications.
4. Learn about the maintenance and management of hospital equipment.
5. Understand the development, usage, and advantages of electronic medical records (EMRs).

Unit 1: Medico-Legal Cases (9 hours)

- Introduction to Medico-Legal Cases
- Laws Associated with Medico-Legal Cases
- Three Core Contents in Medico-Legal Cases with respect to Doctors, Patients, and the Profession

Unit 2: Considerations of Ethics (9 hours)

- Consent
- Confidentiality
- Mental Health
- End of Life Care and Organ Transportation
- Research and Clinical Trials

Unit 3: Hospital Information System (HIS) (9 hours)

- Hospital Information System Management
- Software Applications in:
    - Registration
    - Billing
    - Investigations
    - Reporting
    - Medical Records Management
- Security and Ethical Challenges in HIS

Unit 4: Equipment Operations Management (9 hours)

- Hospital Equipment Repair and Maintenance
- Types of Maintenance
- Job Orders Management
- Equipment Maintenance Logbooks
- Annual Maintenance Contracts (AMCs)

Unit 5: Role of Medical Records in Healthcare Management (9 hours)

- Use of Computers in Medical Records
- Development of Computerized Medical Record Information Processing Systems (EMRs)
- Computer-Stored Records vs Manual Handwritten Records
- Advantages of EMRs over Manual Records

Course Learning Outcomes (CLOs):

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

1. Manage and address medico-legal issues in a healthcare setting.
2. Apply ethical principles in clinical practice and research.
3. Operate and manage hospital information systems efficiently.
4. Oversee equipment maintenance and ensure operational readiness.
5. Implement and leverage electronic medical record systems for better healthcare delivery.

Textbooks:

1. **Hospital Administration and Management** – C.M. Francis and Mario C. De Souza
2. **Hospital and Health Services Administration** – Syed Amin Tabish

Reference Books:

1. **Principles of Hospital Administration and Planning** – BM Sakharkar
2. **Medical Ethics Manual** – World Medical Association
3. **Hospital Information Systems: A Guide** – A. George

Biomedical Instruments in Dialysis

(Elective – B.Sc. Renal Dialysis Technology, 5th Semester)

Course code : RDTT3601a

Course Description

This course introduces the biomedical instruments commonly used in dialysis units. It focuses on the structure, functioning, safety features, and maintenance of

dialysis machines, water treatment systems, and supporting devices. Students will also learn preventive maintenance, troubleshooting, and documentation practices to ensure effective and safe dialysis care.

Course Objectives

The objectives of this course are to:

1. Provide knowledge of biomedical instruments used in dialysis practice.
2. Familiarize students with hemodialysis machines and their safety mechanisms.
3. Train students in water treatment processes and monitoring for dialysis.
4. Introduce supporting biomedical devices used in dialysis care.
5. Develop skills in safe handling, routine maintenance, and equipment documentation.

Course Learning Outcomes (CLOs)

On successful completion of this course, the learner will be able to:

- **CLO1**: Describe the function and principles of dialysis instruments. *(Matches PO1, PO5)*
- **CLO2**: Demonstrate knowledge of hemodialysis machine components, alarms, and safety systems. *(Matches PO1, PO4, PO5)*
- **CLO3**: Explain the water treatment process and perform basic monitoring of water quality. *(Matches PO1, PO7)*
- **CLO4**: Identify and describe the use of supporting devices in dialysis units (reprocessors, pumps, monitors). *(Matches PO2, PO3)*
- **CLO5**: Apply preventive maintenance, safe handling, and proper documentation for biomedical instruments. *(Matches PO4, PO6, PO9)*

Program Outcomes (POs) Mapped

This course contributes to the following **B.Sc. RDT Program Outcomes**:

- **PO1: Clinical care** – Students will operate and maintain biomedical instruments to provide safe, cost-effective dialysis care.
- **PO2: Communication** – Students will communicate effectively about equipment use and safety with patients and healthcare teams.
- **PO3: Membership of a multidisciplinary health team** – Students will collaborate with doctors, engineers, and nurses to manage dialysis equipment.

- **PO4: Ethics and accountability** – Students will practice safe, ethical use of machines with accountability for patient safety.
- **PO5: Professional excellence** – Students will demonstrate technical competence and professionalism in handling biomedical devices.
- **PO6: Leadership and mentorship** – Students will take initiative in equipment management, guiding junior staff when required.
- **PO7: Social accountability and responsibility** – Students will ensure judicious use and sustainability of biomedical resources in dialysis.
- **PO8: Scientific attitude and scholarship** – Students will use evidence-based guidelines for equipment safety and care.
- **PO9: Lifelong learning** – Students will keep updating skills as dialysis technology advances.

Unit-wise Syllabus

Unit 1: Introduction to Biomedical Instruments in Dialysis

- Role of biomedical instruments in dialysis care
- Setup of a dialysis unit and basic instrumentation
- Introduction to hemodialysis machines
- Importance of water treatment systems

Unit 2: Hemodialysis Machine

- Components: blood pump, dialysate pump, sensors, transducers
- Safety features: air bubble detector, pressure monitors, temperature and conductivity control
- Alarms and troubleshooting basics
- Principles of modern dialysis machines

Unit 3: Water Treatment and Supply System

- Role of pure water in dialysis
- Stages of water purification: pre-treatment, RO, deionisation, UV sterilisation
- Monitoring parameters: TDS, chlorine, hardness, endotoxin
- Routine maintenance of RO plants

Unit 4: Supporting Instruments in Dialysis Units

- Dialyzer reprocessing machines (manual & automated)
- Syringe and infusion pumps
- Patient monitoring devices: BP monitors, ECG, pulse oximeters
- Dialysis chairs, beds, and environmental control systems

Unit 5: Care, Maintenance, and Safety of Dialysis Instruments

- Types of maintenance: preventive, corrective, predictive
- Daily, weekly, and monthly checks for dialysis equipment
- Calibration and quality assurance
- Logbooks, service contracts, and AMCs
- Safety measures for handling biomedical equipment

Teaching Methodology

- **Lectures & Multimedia Presentations** – core theory
- **Demonstrations** – hands-on machine operation & water testing
- **Practical Training** – maintenance checklists, logbook exercises
- **Case Studies** – machine breakdowns & troubleshooting

Assessment

- **Theory (60%)**: Written exams, MCQs, short answers, case-based questions
- **Practical (40%)**: Viva, demonstration of equipment use, logbook evaluation

Recommended Books

1. David Lee – *Principles and Practice of Dialysis Technology*
2. R.C. Goyal – *Hospital Administration* (Equipment Management sections)
3. D.K. Sharma – *Hospital Administration and Human Resource Management*
4. WHO Manual – *Medical Device Maintenance*

6th semester						
Course Code	**Course Name**	**Periods per week**			**Credits**	**Hours per week**
		L	**T**	**P**		
RDTT3504	Applied techniques in Peritoneal dialysis	**3**	**1**	**0**	**4**	**4**
RDTT3505	Medical management in dialysis patients	**3**	**1**	**0**	**4**	**4**
RDTT3506	Recent advancements in dialysis and transplantation	**3**	**1**	**0**	**4**	**4**
RDTL3502	Clinical skills IV	**0**	**0**	**16**	**8**	**16**
RDTT3602a RDTT3602b RDTT3602c	Programme electives 2 a. Imaging and interpretation in renal failure. b. Biostatistics and research methodology. c. Asepsis in Dialysis Therapy	**3**	**0**	**0**	**3**	**3**
--	Seminar	**0**	**0**	**0**	**0**	**1**
--	Library	**0**	**0**	**0**	**0**	**1**
--	Extra-curricular activities	**0**	**0**	**0**	**0**	**2**
--	Mentoring	**0**	**0**	**0**	**0**	**1**
	Total	**12**	**3**	**16**	**23**	**36**

3rd YEAR: VI SEMESTER

		L	T	P	C
RDTT3504	**Applied techniques in Peritoneal dialysis. Paper-1**	**3**	**1**	**0**	**4**

Course Description:

This course explores various peritoneal dialysis modalities, including manual and automated therapies. It covers patient selection, procedural techniques, principles of dialysis, and catheter access. Emphasis is placed on managing complications such as peritonitis, exit site, and tunnel infections to ensure effective and safe dialysis treatment.

Course Objective:

Students undergoing this course are expected to:

1. To understand the different modalities of peritoneal dialysis, including manual and automated therapies.
2. To learn the procedures involved in peritoneal dialysis, including patient selection, the exchange cycle, and aseptic techniques.
3. To comprehend the principles of peritoneal dialysis, including diffusion, osmotic ultrafiltration, membrane characteristics, and adequacy.
4. To gain knowledge of peritoneal dialysis catheter access, including types, placement, and complications.
5. To recognize and manage complications of peritoneal dialysis, including peritonitis and infections.

Unit 1 **Peritoneal dialysis modalities** **12 hrs**

- Manual Therapies
- Automated peritoneal dialysis
- Combination therapies
- CAPD vs APD

Unit 2 **Peritoneal dialysis Procedure** **12 hrs**

- Patient selection
- The exchange or cycle
- Aseptic technique
- The connection/Transfer set

Unit 3 **Peritoneal dialysis Principles** **12 hrs**

- Diffusion
- Osmotic Ultrafiltration
- Membrane characteristics
- Adequacy

Unit 4 **Peritoneal dialysis Catheter access** **12 hrs**

- Catheter types
- Catheter placement
- Catheter complications post insertion
- Exit site

Unit 5 **Complications of Peritoneal Dialysis** **12 hrs**

- Peritonitis
- Exit site infection
- Tunnel infection
- Non-infectious complications

Course learning outcomes:

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

1. Understand Peritoneal Dialysis Modalities
2. Perform Peritoneal Dialysis Procedures
3. Apply Peritoneal Dialysis Principles
4. Manage Catheter Access for Peritoneal Dialysis
5. Handle Complications of Peritoneal Dialysis

Textbooks

1. Peritoneal Dialysis: A Clinical Handbook by Ramesh Khanna and Raymond T. Krediet
2. Clinical Peritoneal Dialysis by Claudio Ronco, Carlo Crepaldi, and Dinna N. Cruz
3. Essentials of Peritoneal Dialysis by Gabriel Ricciardi, Alejandro Ferreiro, and Pablo Durango
4. Peritoneal Dialysis Therapy by R. Gokal and P. J. Brenchley

Reference Books

1. Handbook of Peritoneal Dialysis by Steven Guest
2. Peritoneal Dialysis International Journal by ISPD (International Society for Peritoneal Dialysis)
3. Peritoneal Dialysis: From Basic Concepts to Clinical Excellence by Claudio Ronco, Livio Dell'Aquila, and Carlo Crepaldi
4. The Essentials of Peritoneal Dialysis by R. Gokal and R. Khanna

3rd YEAR: VI SEMESTER

		L	T	P	C
RDTT3505	**Medical management in dialysis patients Paper-2**	**3**	**1**	**0**	**4**

Course Description:

This course provides a comprehensive understanding of hemodialysis, including patient assessment, management of critical conditions, and emergency procedures. It covers vascular access care, iron and erythropoietin therapy, anticoagulation, and vaccinations. Special emphasis is placed on dialysis in critically ill patients, SLED, and ICU monitoring for optimal patient care.

Course Objective:

Students undergoing this course are expected to:

1. To understand the general rules and patient assessment protocols for hemodialysis.
2. To manage critical conditions in hemodialysis patients, including unconsciousness, hyperkalemia, seizures, and pregnancy.
3. To follow procedures for emergency dialysis and care for vascular access.
4. To administer iron, erythropoietin therapy, and vaccinations effectively.
5. To perform dialysis in critically ill patients and monitor them in the ICU.

Unit 1 Haemodialysis Procedures and Patient Assessment 12 hrs

- General Rules for Hemodialysis Unit
- Pre-dialysis assessment of the patient
- Starting of Hemodialysis
- Assessment of the patient during Dialysis
- Assessment of the patient post Dialysis

Unit 2 Management of Critical Conditions in Haemodialysis 12 hrs

- Management of unconscious patient
- Management of Hyperkalemia in Hemodialysis patients.
- Management of Seizures during Hemodialysis.
- Dialysis in Pregnancy

Unit 3 Emergency Dialysis Procedures and Vascular Access Care 12 hrs

- Procedures to be followed for emergency dialysis
- Investigations for Chronic Hemodialysis patients
- Access recirculation and management
- Care of Vascular Access

Unit 4 Therapies and Vaccinations in Haemodialysis 12 hrs

- Iron therapy
- Erythropoietin therapy
- Anticoagulation
- Hepatitis B vaccination
- Varicella vaccination
- Pneumococcal vaccination

Unit 5 Dialysis in Critically ill Patients 12 hrs

- Dialysis in critically ill patient
- SLED
- Monitoring of dialysis patients in ICU

Course learning outcomes:

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

1. Perform Comprehensive Hemodialysis Procedures
2. Manage Critical Conditions During Hemodialysis
3. Execute Emergency and Routine Hemodialysis Procedures
4. Administer Essential Therapies and Vaccinations
5. Provide Dialysis for Critically Ill Patients and Monitor ICU Patients

Textbooks

1. Handbook of Dialysis by John T. Daugirdas, Peter G. Blake, and Todd S. Ing
2. Principles and Practice of Dialysis by William L. Henrich
3. Clinical Dialysis by Allen R. Nissenson and Richard E. Fine
4. Core Curriculum for Nephrology Nursing by Caroline S. Counts

Reference Books

1. Handbook of Chronic Kidney Disease Management by John T. Daugirdas and Jean L. Holley
2. Oxford Handbook of Dialysis by Jeremy Levy, Edwina Brown, and Anastasia Lawrence
3. Comprehensive Clinical Nephrology by Richard J. Johnson, John Feehally, and Jürgen Floege
4. Nephrology and Hypertension Board Review by Phuong-Chi Pham and Phuong-Thu Pham

3rd YEAR: VI SEMESTER

		L	T	P	C
RDTT3602a	IMAGING AND INTERPRETATION IN RENAL FAILURE				
	Programme Elective – 2	3	0	0	3

Course Description

This course provides knowledge of diagnostic imaging techniques and laboratory evaluations used in renal failure and renal disease treatment (RDT). It focuses on imaging modalities such as Ultrasound (USG), Computed Tomography (CT), Magnetic Resonance Imaging (MRI), and Nuclear Medicine for assessing kidney structure and function.
Students will also learn about renal anatomy, physiology, acid–base balance, histological structure of the nephron, and laboratory investigations including hematological tests and urinalysis. These diagnostic methods help in early detection, evaluation, and management of renal disorders.

Course Objectives

Students undergoing this course are expected to:

1. Understand renal anatomy and physiology
   Learn the structure and anatomical relations of the kidneys, ureters, bladder, and urethra in both males and females.
2. Understand acid–base balance
   Gain knowledge of the basic concepts of acid–base balance and its importance in renal function.
3. Study renal histology
   Understand the microscopic structure of the kidney and identify the components of the nephron.
4. Learn renal imaging techniques
   Understand the use of ultrasound, CT scan, MRI, and nuclear medicine in diagnosing kidney diseases.
5. Interpret laboratory investigations
   Learn to analyze hematological, biochemical, and urinalysis results related to renal disorders.

Unit 1 – Ultrasound (USG) Evaluation

Topics Covered:

• Evaluation of renal function and diagnostic tests
• Ultrasound imaging of the urinary system
• Assessment of kidney size, structure, and abnormalities using ultrasonography

Ultrasound is commonly used for detecting:

- Kidney stones
- Hydronephrosis
- Renal masses
- Structural abnormalities

Unit 2 – CT Evaluation

Topics Covered:

• Computed Tomography (CT) of the kidney

• Urography techniques

CT imaging provides detailed cross-sectional images of the kidneys and urinary tract.

Applications include:

- Detection of renal tumors
- Identification of kidney stones
- Evaluation of urinary tract obstruction
- Assessment of trauma and congenital anomalies

Unit 3 – MRI Evaluation

Topics Covered:

• Magnetic Resonance Imaging (MRI) related to Renal Disease Treatment (RDT)

• Renal angiography

MRI helps in:

- Detailed imaging of kidney tissues
- Evaluating renal blood vessels
- Detecting tumors, cysts, and vascular abnormalities

Renal angiography is used to study renal circulation and vascular diseases.

Unit 4 – Nuclear Medicine Related to RDT

Topics Covered:

• Radionuclide studies of the urinary system

• Renal biopsy and histopathology techniques

Radionuclide imaging helps evaluate:

- Renal perfusion
- Glomerular filtration rate (GFR)
- Functional assessment of kidneys

Renal biopsy involves removal of kidney tissue for microscopic examination, which helps diagnose diseases such as:

- Glomerulonephritis
- Nephrotic syndrome
- Chronic kidney disease

Unit 5 – Hematological Aspects Related to RDT

Topics Covered:

• Hematological and biochemical evaluation of renal diseases

• Urinalysis – physical, biochemical, and microbiological examination

These investigations help assess kidney function through:

Hematological tests:

- Hemoglobin levels
- Complete blood count (CBC)

Biochemical tests:

- Serum creatinine
- Blood urea nitrogen (BUN)
- Electrolyte levels

Urinalysis includes:

- Physical examination (color, turbidity)
- Biochemical tests (protein, glucose, ketones)
- Microbiological analysis for infections

Course Learning Outcomes

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

1. Understand renal anatomy and histological structure of the nephron
2. Perform and interpret ultrasound evaluation of the urinary system
3. Understand the application of CT and MRI imaging in renal disease diagnosis
4. Interpret nuclear medicine studies and renal biopsy results
5. Analyze hematological, biochemical, and urinalysis investigations for renal disorders

References

Textbooks

1. Diagnostic Ultrasound: Abdomen and Pelvis by Carol M. Rumack – A comprehensive guide to ultrasound imaging techniques used in abdominal and renal evaluations.
2. Computed Tomography and Magnetic Resonance Imaging of the Whole Body by John R. Haaga and Daniel Boll – Detailed coverage of CT and MRI applications in diagnosing renal and abdominal diseases.
3. Nuclear Medicine: The Requisites by Harvey A. Ziessman and James H. Thrall – Provides essential knowledge on radionuclide imaging and nuclear medicine techniques.
4. Brenner and Rector's The Kidney edited by Barry M. Brenner – A classic reference covering kidney physiology, pathology, and diagnostic evaluation.
5. Clinical Biochemistry and Metabolic Medicine by Martin Crook – Covers biochemical investigations used in diagnosing renal disorders.

Reference Books

1. Ultrasound in Urology: A Practical Approach to Clinical Problems by David L. King.
2. CT and MRI of the Whole Body by John R. Haaga.
3. Nuclear Medicine in Clinical Diagnosis and Treatment by Peter Joseph Ell.
4. Clinical Laboratory Medicine by Kenneth D. McClatchey – A reference for hematological and biochemical investigations.
5. Handbook of Dialysis by John T. Daugirdas – Useful for understanding renal failure management and diagnostic evaluation.

3rd YEAR: VI SEMESTER

		L	T	P	C
RDTT3506	**Recent advancements in dialysis and transplantation**				
	Paper-3	**3**	**1**	**0**	**4**

Course Description:

This course explores pediatric dialysis, recent advancements such as home and online dialysis, and telemedicine in dialysis practices. It covers renal transplantation, including immunology and immunosuppressive medications, organ donation concepts, and various transplantation methods. Additionally, it introduces the innovative concept of wearable artificial kidneys.

Course Objective:

Students undergoing this course are expected to:

1. To understand the indications, apparatus, and management of complications in pediatric dialysis.
2. To learn about recent advancements in dialysis, including home dialysis, nocturnal dialysis, online dialysis, and telemedicine.
3. To gain knowledge of renal transplantation, including immunology and the importance of immunosuppressive medications.
4. To comprehend the concept of organ donation and various types of transplantation, including live donor, cadaver, paired exchange, and ABO-incompatible transplantation.
5. To explore different concepts of wearable artificial kidneys.

Unit 1 **Paediatric dialysis** **12 hrs**

- Indication
- Pediatric dialysis apparatus
- Ramification of the circuit
- Complications and management

Unit 2 **Recent advancements in dialysis** **12 hrs**

- Concept of Home Dialysis
- Home dialysis machines
- Nocturnal dialysis
- Online dialysis
- Telemedicine in dialysis practices

Unit 3 **Renal Transplantation** **12 hrs**

- Introduction to kidney transplantation immunology
- Importance of Immunosuppressive medications

Unit 4 **Concept of Organ Donation** **12 hrs**

- Live donor and cadaver transplantation
- paired exchange transplantation
- ABO-incompatible transplantation.
- transplant in sensitized recipients.

Unit 5 **Wearable artificial kidney** **12 hrs**

- Different concepts

Course learning outcomes:

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

1. Understand Pediatric Dialysis
2. Apply Recent Advancements in Dialysis
3. Grasp Renal Transplantation Basics
4. Understand Organ Donation and Transplantation Techniques
5. Explore Wearable Artificial Kidney Concepts

Textbooks

1. Pediatric Dialysis by Bradley A. Warady, Franz Schaefer, Steven R. Alexander
2. Handbook of Dialysis by John T. Daugirdas, Peter G. Blake, and Todd S. Ing
3. Comprehensive Clinical Nephrology by Richard J. Johnson, John Feehally, and Jürgen Floege
4. Kidney Transplantation: Principles and Practice by Peter J. Morris and Stuart J. Knechtle

Reference Books

1. Core Curriculum for Nephrology Nursing by Caroline S. Counts
2. Handbook of Chronic Kidney Disease Management by John T. Daugirdas and Jean L. Holley
3. Transplantation Immunology by Philip Hornick
4. Wearable Artificial Kidney: Technology and Clinical Applications by Claudio Ronco and Carlo Crepaldi

3rd YEAR: VI SEMESTER

		L	T	P	C
RDTL3602b	**BIOSTATISTICS AND RESEARCH METHODOLOGY**				
	Programme elective II	**3**	**0**	**0**	**3**

Course Description:

This course covers advanced diagnostic techniques in renal disease treatment (RDT), including ultrasound, CT, MRI, and nuclear medicine evaluations. Students will learn renal function assessment, imaging methods, radionuclide studies, biopsy techniques, and comprehensive hematological and biochemical evaluations, including urinalysis, for diagnosing and managing renal ailments.

Course Objective:

Students undergoing this course are expected to:

1. Understand renal imaging techniques: Learn to perform and interpret ultrasound, CT, MRI, and radionuclide studies for renal evaluation.
2. Evaluate renal function: Conduct comprehensive renal function assessments using various diagnostic tests.
3. Perform renal biopsies: Gain skills in performing renal biopsies and analyzing histopathology results.
4. Analyze lab results: Conduct and interpret hematological and biochemical evaluations.
5. Conduct urinalysis: Perform and analyze physical, biochemical, and microbiological aspects of urinalysis.

Unit 1

- **Introduction:** Statistics, Biostatistics, Frequency distribution
- **Measures of central tendency**: Mean, Median, Mode
- **Measures of dispersion:** Dispersion, Range, standard deviation,
- **Correlation:** Definition, Karl Pearson's coefficient of correlation, Multiple correlation

Unit 2

- **Regression:** Curve fitting by the method of least squares, fitting the lines y= a + bx and x = a + by, Multiple regression, standard error of regression
- **Probability:** Definition of probability, Binomial distribution, Normal distribution, Poisson's distribution, properties – problems Sample, Population, large sample, small sample, Null hypothesis, alternative hypothesis, sampling, essence of sampling, types of sampling, Error-I type, Error-II type, Standard error of mean (SEM)

Unit 3

- **Parametric test:** t-test(Sample, Pooled or Unpaired and Paired) , ANOVA, (One way and Two way), Least Significance difference
- **Non-Parametric tests:** Wilcoxon Rank Sum Test, Mann-Whitney U test, Kruskal-Wallis test, Friedman Test

Unit 4

- **Introduction to Research:** Need for research, Need for design of Experiments, Experiential Design Technique, plagiarism

Unit 5

- **Graphs:** Histogram, Pie Chart, Cubic Graph, response surface plot, Counter Plot graph
- **Designing the methodology:** Sample size determination and Power of a study, Report writing and presentation of data, Protocol, Cohorts studies, Observational studies, Experimental studies, Designing clinical trial, various phases.

Course learning outcomes:

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

1. Understand and perform renal imaging techniques (USG, CT, MRI, radionuclide studies)
2. Evaluate renal function using diagnostic tests
3. Interpret imaging results and identify renal pathologies
4. Conduct renal biopsies and analyze histopathology results
5. Perform hematological and biochemical evaluations, including urinalysis, for comprehensive renal assessment

Textbooks

1. Diagnostic Ultrasound: Abdomen and Pelvis by Rumack, Carol M.
2. Computed Tomography and Magnetic Resonance of the Whole Body by John R. Haaga and Daniel Boll
3. Nuclear Medicine: The Requisites by Harvey A. Ziessman, James H. Thrall
4. Clinical Biochemistry and Metabolic Medicine by Martin Crook

Reference Books

1. Ultrasound in Urology: A Practical Approach to Clinical Problems by David L. King
2. CT and MRI of the Whole Body by John R. Haaga
3. Nuclear Medicine in Clinical Diagnosis and Treatment by Peter Joseph Ell
4. Clinical Laboratory Medicine by Kenneth D. McClatchey

3rd YEAR: VI SEMESTER

		L	T	P	C
RDTL3602c	**ASEPSIS IN DIALYSIS THERAPY (RDTT3602c)**				
	Programme elective II	**3**	**0**	**0**	**3**

Course Description

This course focuses on the principles and practices of asepsis in dialysis therapy, with emphasis on infection prevention and control measures in hemodialysis and peritoneal dialysis units. Students will gain knowledge about medical asepsis, surgical asepsis, sterilization, disinfection, and standard infection control precautions necessary to ensure patient safety and reduce dialysis-associated infections. The course also highlights the role of healthcare professionals in maintaining infection-free dialysis environments and improving patient outcomes.

Course Objectives

Students undergoing this course are expected to:

1. Understand the principles of asepsis and infection control in dialysis therapy.
2. Identify sources and modes of infection transmission in dialysis units.
3. Apply standard precautions, including hand hygiene and use of personal protective equipment (PPE).
4. Understand sterilization and disinfection techniques used for dialysis equipment and environment.
5. Implement infection control protocols to prevent dialysis-related infections and ensure patient safety.

Unit 1 – Introduction to Asepsis in Dialysis Therapy

Topics Covered:

- Definition and importance of asepsis
- Medical asepsis and surgical asepsis
- Role of aseptic practices in dialysis patient safety
- Healthcare-associated infections (HAIs) in dialysis settings
- Overview of infection control programs in healthcare facilities

Unit 2 – Sources and Transmission of Infection in Dialysis Units

Topics Covered:

- Microorganisms involved in dialysis infections (bacteria, viruses, fungi)
- Sources of infection: patients, healthcare staff, environment, equipment
- Modes of transmission: contact, droplet, and blood-borne transmission
- Dialysis-related infections: vascular access infections and bloodstream infections
- Risk factors for infections in dialysis patients

Unit 3 – Standard Precautions and Personal Protective Measures

Topics Covered:

- Hand hygiene techniques and importance in dialysis care
- Personal protective equipment (PPE): gloves, masks, gowns, and face shields
- Safe injection practices and needle safety
- Respiratory hygiene and cough etiquette
- Biomedical waste management and safe disposal practices

Unit 4 – Sterilization and Disinfection in Dialysis

Topics Covered:

- Principles of cleaning, disinfection, and sterilization
- Methods of sterilization: steam sterilization, chemical sterilization, and low-temperature methods
- Common disinfectants used in dialysis units
- Disinfection of dialysis machines and water systems
- Environmental cleaning and surface disinfection in dialysis facilities

Unit 5 – Infection Control Protocols in Dialysis Therapy

Topics Covered:

- Aseptic technique during vascular access cannulation
- Infection control practices in hemodialysis and peritoneal dialysis
- Surveillance and reporting of dialysis-related infections
- Role of hospital policies, protocols, and infection control audits
- Education and training of healthcare staff for infection prevention

Course Learning Outcomes

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

1. Understand and explain principles of medical and surgical asepsis in dialysis therapy.
2. Identify sources, modes of transmission, and prevention of infections in dialysis units.
3. Demonstrate correct hand hygiene techniques and use of personal protective equipment.
4. Understand sterilization and disinfection procedures for dialysis equipment and environment.
5. Apply infection control protocols to prevent dialysis-related infections and improve patient safety.

Textbooks

1. APIC Text of Infection Control and Epidemiology – Published by the Association for Professionals in Infection Control and Epidemiology.
2. Handbook of Dialysis by John T. Daugirdas.
3. Lippincott Manual of Nursing Practice edited by Sandra M. Nettina.

Reference Books

1. Centers for Disease Control and Prevention – CDC Guidelines for Infection Prevention in Dialysis Facilities.
2. World Health Organization – WHO Practical Guidelines for Infection Control in Healthcare Facilities.
3. World Health Organization – WHO Guidelines on Hand Hygiene in Health Care.
4. Centers for Disease Control and Prevention – CDC Dialysis Safety Program.

3rd YEAR: VI SEMESTER

		L	T	P	C
RDTL3502	**Clinical Skills 4**				
	Practical/Training Paper	**0**	**0**	**16**	**8**

Course Description:

This course provides practical training on the initiation and closing of hemodialysis through central venous catheters, daily maintenance of a dialysis center, and troubleshooting dialysis machine alarms. It covers criteria for machine allocation, preparation of heparin, routine blood biochemistry, and management of complications during dialysis to ensure effective patient care.

Course Objective:

Students undergoing this course are expected to:

1. To learn the initiation and closing procedures for hemodialysis through central venous catheters.
2. To understand the daily maintenance of a dialysis center and troubleshoot dialysis machine alarms.
3. To know the criteria for allotting dialysis machines to patients and prepare heparin for hemodialysis.
4. To conduct routine blood biochemistry tests for dialysis patients.
5. To manage complications that may arise during dialysis sessions.

Unit 1 Initiation of Haemodialysis 48 hrs

a. Initiation of Hemodialysis through central venous catheters like internal jugular, femoral & subclavian vein.

Unit 2 Closing of Haemodialysis 48 hrs

a. Closing of dialysis through central venous catheters like internal jugular, femoral & subclavian vein.
b. closing of internal and external access at the end of hemodialysis

Unit 3 Daily Maintenance and Troubleshooting in Dialysis Center 48 hrs

a. Daily maintenance of dialysis center,
b. Different alarms in dialysis machine and its troubleshooting,

Unit 4 Dialysis Machine Allocation and Heparin Preparation 48 hrs

a. Criteria for allotting dialysis machines to a patient.
b. Preparation and setting up of heparin in hemodialysis machine

Unit 5 Routine Blood Biochemistry and Complication Management 48 hrs

a. Routine blood biochemistry
b. Management of complications during dialysis

Course learning outcomes:

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

1. Initiate Hemodialysis Using Central Venous Catheters
2. Close Hemodialysis Sessions and Manage Access
3. Maintain Dialysis Centers and Troubleshoot Alarms
4. Allot Dialysis Machines and Prepare Heparin
5. Conduct Routine Blood Biochemistry and Manage Complications

Textbooks

1. Handbook of Dialysis by John T. Daugirdas, Peter G. Blake, and Todd S. Ing
2. Principles and Practice of Dialysis by William L. Henrich
3. Clinical Dialysis by Allen R. Nissenson and Richard E. Fine
4. Core Curriculum for Nephrology Nursing by Caroline S. Counts

Reference Books

1. Handbook of Chronic Kidney Disease Management by John T. Daugirdas and Jean L. Holley
2. Oxford Handbook of Dialysis by Jeremy Levy, Edwina Brown, and Anastasia Lawrence
3. Comprehensive Clinical Nephrology by Richard J. Johnson, John Feehally, and Jürgen Floege
4. Nephrology and Hypertension Board Review by Phuong-Chi Pham and Phuong-Thu Pham

7th Semester						
Course Code	Course Name	Periods per week			Credits	Hours per Semester
		L	T	P		
RDTI4501*	Internship-I			48	25	1104
TOTAL				48	25	1104

8th Semester						
Course Code	Course Name	Periods per week			Credits	Hours per Semester
		L	T	P		
RDTI4502*	Internship-II			48	25	1104
RDTP4501	Project			8	6	180
TOTAL				51	31	1284

RDTI4501	**Internship (Practical's)**	**1350 hours**
RDTP4501	**Project**	**150 hours**

BSc RDT IV YEAR - INTERNSHIP :

1. **Project Submission:** Project work is a compulsory requirement for the B. Sc. RDT – course. Each student can choose a topic for the project in any one of the subjects - Haemodialysis/Peritoneal dialysis/Dialysis unit Management, which would be approved by his/her supervising Teacher. A Supervising Teacher should have a minimum of 3 years of teaching experience in the concerned subject.

   The student should be under the guidance of the supervising staff, carry out the work on the topic selected and prepare a project report including results and references—the project report duly certified by the supervising staff and Head of the department of RDT.

   One month before the ''Fourth Year university practical examination'' the project should be submitted to the HOD.

   Twelve-month compulsory rotational postings during the internship, which students have to work under the supervision of experienced staff in the following areas:

   - ICU Dialysis

- Pediatric dialysis
- Peritoneal dialysis
- CRRT
- Plasmapheresis
- Haemodialysis
- Nephrology Procedure room
- Two Weeks Posting with Kidney transplant coordinator
- Two Week Posting in Emergency Department

2. **Logbook:** Maintain a daily Logbook checked and signed by In charge of the unit. Submit the monthly summary of procedures along with the logbook, checked and signed by the coordinator or in charge.

3. **Practical's**
   - A V fistula / AV graft cannulation
   - Initiation of dialysis through central venous temporary and tunneled catheters
   - Catheter-related complications management
   - Closing/termination of new AV access dialysis
   - Adequacy of dialysis
   - Single needle dialysis settings
   - Post dialysis sample collections.
   - Acid and bicarbonate concentrate selection.
   - Reuse of dialyzers- quality assessment.
   - Machine troubleshooting
   - Isolated ultrafiltration settings
   - Dialysis machines minor troubleshooting- Treatment-related and machine-related
   - Performance of peritoneal dialysis exchange
   - PET test
   - Automated Peritoneal dialysis machine management: TIPD, CCPD
   - Peritoneal dialysis- Transfer set/ Extension change
   - Peritoneal dialysis – Titanium adaptor change
   - Peritoneal dialysis - sample collection of PD fluid
   - CRRT -Priming and starting treatment
   - Plasmapheresis- Priming and starting the treatment
   - BCLS/ACLS demonstration.
   - DFPP settings
   - RO water sample collection for water culture, endotoxin and chemical analysis
   - RO plant monitoring and disinfection.
   - Pediatric dialysis settings -pediatric Hemodialysis, Peritoneal dialysis, CRRT and plasmapheresis
   - Online HDF machine preparation and demonstration

- Hemoperfusion- Priming and starting treatment

Reference books:

1. Handbook of dialysis – 5th Edition – John T Daugirdass
2. Handbook of dialysis therapy – Allen R Nissenson
3. Core curriculum for dialysis technician 6th edition
4. Oxford handbook of dialysis- 4th Edition
5. KDOQI guidelines.
6. Dialysis Water and Dialysate Recommendations: AAMI

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