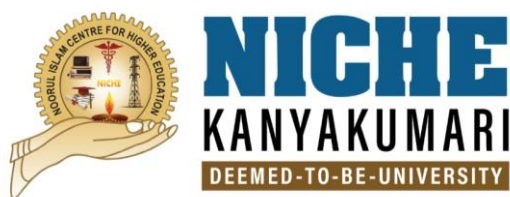


NOORUL ISLAM CENTRE FOR HIGHER EDUCATION
(Deemed to be University Under Section 3 of the UGC Act, 1956)
Kumaracoil, Thuckalay

DEPARTMENT OF ALLIED HEALTH SCIENCE



**B.Sc. RENAL DIALYSIS TECHNOLOGY
CURRICULUM AND SYLLABI**

REGULATION 2021



NOORUL ISLAM CENTRE FOR HIGHER EDUCATION

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DEPARTMENT OF ALLIED HEALTH SCIENCES B.Sc RENAL DIALYSIS TECHNOLOGY CURRICULUM & SYLLABI REGULATION – 2021

Vision of the University

To be recognized by the Government and society at large as an institution able to deliver excellence with relevance in the field of higher education and research focusing on the needs of the nation in tune with the technological revolution to cope with the knowledge explosion and global competence.

Mission of the University

To develop the institution as a Centre of Excellence, keeping pace with the advances in the field, so as to provide quality higher education to the students and instill in them high standards of discipline and ethics so that they become enlightened individuals in the service of humanity and to carry out focused research in the frontier areas of science and technology.

Faculty of Allied Health Sciences

Department of Allied Health Sciences

Vision of the Department

Empower and elevate students to understand the conditions conducive to harmonious healthy society by building up youth towards achieving it when it is practised effectively.

Mission of the Department

The mission of the department of Allied Health Sciences at NICHE is to build up new chorum of youth towards application and practice of knowledge. Recent techniques provide accessible, innovative care service, antisocial activities and ways to improve outcomes through science and advanced research.

Description of the programme : This program focuses on training students in the field of renal care and dialysis. The curriculum involves anatomy, physiology, pathology, various dialysis techniques, equipments and patient care in the context of renal disorders. The goal is to prepare graduates to work as skilled renal dialysis technologist, contributing to the care and well being of indivituals with kidney diseases.

Programme Educational Objectives - PEO	
PEO-01	To acquire and apply knowledge and skills to ensure safe and effective practice.
PEO-02	Utilize effective communication, collaboration and teamwork skills to facilitate continued professional development.
PEO-03	To engage in professional development or post-graduate education, to continue their self-development in patient care or other related fields.
PEO-04	Engaged in professional practice as provide safe and effective care using intelligent kindness in hospital settings.
PEO-05	To provide self-directed learning with management principles to identify and create professional opportunities in the field of health.

Graduate Attributes-GA	
GA-1	Foundational Scientific Knowledge Acquire a deep understanding of fundamental principles across core scientific disciplines, including physics, chemistry, biology, and mathematics, providing a strong foundation for further learning and research.
GA-2	Practical Skills and Laboratory Competence Develop hands-on laboratory skills and the ability to conduct experiments, analyze data, and apply scientific methods to real-world problems in various scientific domains
GA-3	Research and Analytical Thinking Foster research capabilities and critical thinking skills, enabling the design and execution of scientific investigations, interpretation of experimental results, and formulation of evidence-based conclusions.
GA-4	Data Analysis and Statistical Techniques Utilize modern data analysis techniques and statistical tools to interpret experimental data, draw meaningful conclusions, and solve complex scientific and mathematical problems.
GA-5	Interdisciplinary Knowledge and Applications Integrate knowledge from multiple scientific disciplines to approach problems holistically, understanding how different scientific fields contribute to innovation and real-world applications.
GA-6	Environmental Awareness and Sustainability Demonstrate an understanding of environmental issues and the impact of scientific practices on the environment, promoting sustainability and responsible use of natural resources in all scientific endeavors.
GA-7	Ethical Conduct and Scientific Integrity Uphold ethical standards and integrity in scientific research and practice, ensuring honesty, accuracy, and responsibility in data handling, experimentation, and reporting.
GA-8	Communication and Presentation Skills Develop effective communication skills to articulate scientific concepts, research findings, and technical information clearly and concisely to both scientific and non-scientific audiences.
GA-9	Technology Integration and Innovation Apply cutting-edge technologies and tools in scientific experimentation and research, leveraging innovation to drive progress and stay at the forefront of scientific discovery.
GA-10	Lifelong Learning and Adaptability Cultivate a mindset of continuous learning, staying informed about scientific advancements and adapting to new tools, methods, and technologies to remain competitive in a rapidly evolving scientific landscape.

Programme Outcome - PO	
PO-A	Students are familiar with basic subjects of Renal Dialysis technology.
PO-B	Knowledge on the inter disciplinary subjects make them excel in the programme.
PO-C	Performs the health care procedures based on their theoretical knowledge.
PO-D	Based on the theoretical knowledge obtained students will be able to identify the signs and symptoms of diseases and new solutions can be formulated.
PO-E	Knowledge on dialysis will help them to diagnose the critical complications and identify solutions to them.
PO-F	Provide health education to the society in mitigating health problems through healthy lifestyle.
PO-G	Giving awareness to the society regarding the prevention of health issues and the existing technologies to identify the kidney problems.
PO-H	Group assignments and projects will make them to understand and co operate with co-workers.
PO-I	Students will be able to develop skills of effective communication and principles of team work.
PO-J	Clinical experience enables them to understand their roles and responsibilities as professionals.
PO-K	Designing new methods in care of patients through research in concern with the social ethics.
PO-L	Innovating cost effective technology which can be affordable for all sectors of the society.
PO-M	Motivating the students to ensure health care services to society by upgrading their knowledge.

Mapping of Graduate Attributes and Programme Outcome

GA PEOs	GA-01	GA-02	GA-03	GA-04	GA-05	GA-06	GA-07	GA-08	GA-09	GA-10
PEO-A	H	H	H	H	A	H	H	H	H	H
PEO-B	H	H	A	H	H	H	H	A	A	H
PEO-C	H	H	A	H	A	H	H	H	H	H
PEO-D	H	H	H	H	H	H	H	A	A	H
PEO-E	H	H	H	H	H	H	A	H	H	H

H- Highly Associated

A- Associated

Not – Not Associated

Mapping of Programme Educational Objective (PEOs) and Programme Outcomes (POs)

PEO PO	PEO-01	PEO-02	PEO-03	PEO-04	PEO-05
PO-A	H	A	A	H	H
PO-B	H	H	H	H	A
PO-C	A	H	H	H	H
PO-D	H	H	H	H	H
PO-E	H	H	H	H	H
PO-F	H	A	H	H	H
PO-G	H	H	H	H	H
PO-H	H	H	A	A	A
PO-I	H	H	A	A	A
PO-J	H	H	H	H	H
PO-K	H	H	A	H	H
PO-L	H	H	H	H	H
PO-M	H	A	H	H	H

H- Highly Associated

A- Associated

Not – Not Associated

Duration of the programme: 4 Years / 6 Semesters + 1 year internship

Total credit : 138

**CURRICULUM & SYLLABI
(REGULATION 2021)
SEMESTER I**

Sl. No	Course Code	Course Title	L	T	P	C
THEORY						
1.	EG3603	English	3	1	0	4
2.	BS3601	Anatomy	3	1	0	4
3.	BS3602	Physiology	3	1	0	4
4.	BS3603	Basic Biochemistry	3	1	0	4
5.	BS3604	Environmental Science	2	0	0	2
PRACTICALS						
6.	BS3671	Anatomy Laboratory	0	0	2	2
7.	BS3672	Physiology Laboratory	0	0	2	2
8.	BS3673	Basic Biochemistry Laboratory	0	0	2	2
TOTAL			14	4	6	24

SEMESTER II

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	BS3605	General Pathology	3	1	0	4
2.	BS3606	Microbiology	3	1	0	4
3.	BS3607	Pharmacology	3	1	0	4
4.	BS3608	Psychology	2	0	0	2
5.	BS3609	Introduction to Computer	2	0	0	2
PRACTICALS						
6.	BS3674	Pathology Laboratory	0	0	2	2
7.	BS3675	Microbiology Laboratory	0	0	2	2
8.	BS3676	Pharmacology Laboratory	0	0	2	2
TOTAL			13	3	6	22

SEMESTER III

Sl. No.	Course Code	Course Title	L	T	P	C
THEORY						
1	DT3601	Applied Pathology for Renal Dialysis Technology	3	1	0	4
2	DT3602	Applied Microbiology for Renal Dialysis Technology	3	1	0	4
3	DT3603	Introduction to Renal Dialysis Technology	3	1	0	4
4	BS36S3	Introduction Biomedical Instrumentation	2	0	0	2
5	BS36S4	Health care	3	0	0	3
CLINICAL POSTINGS & PRACTICALS						
6	DT3672	Applied Pathology Lab for Renal Dialysis Technology	0	0	2	2
7	DT3673	Applied Microbiology Lab for Renal Dialysis Technology	0	0	2	2
8	DT3671	Introduction to Renal Dialysis Technology Laboratory	0	0	2	2
TOTAL			14	3	6	23

SEMESTER IV

Sl. No.	Course Code	Course Title	L	T	P	C
THEORY						
1	BS36S5	Patient care and Basic Nursing	3	1	0	4
2	DT3604	Basic Concepts of Renal disease	3	1	0	4
3	DT3605	Acute & Chronic kidney diseases & Nutrition	3	1	0	4
4	BS36S6	Biostatistics and Research Methodology	2	0	0	2
5	BS36S7	Constitution of India	3	0	0	3
CLINICAL POSTINGS & PRACTICALS						
6	BS3679	Patient care and Basic Nursing Laboratory	0	0	2	2
7	DT3674	Basic concepts of Renal disease Laboratory	0	0	2	2
8	DT3675	Acute & Chronic Kidney Diseases & Nutrition Technology Laboratory	0	0	2	2
TOTAL			14	3	6	23

SEMESTER V

SL. No	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	DT3606	Hemodialysis – I	3	1	0	4
2.	DT3607	Hemodialysis – II	3	1	0	4
3.	DT3608	Hemodialysis – III	3	1	0	4
4.	DT3609	Biomedical Engineering Devices for Renal Dialysis Technology	3	0	0	3
5.	BS36S9	Medical Ethics	2	0	0	2
PRACTICAL						
6.	DT3676	Hemodialysis Laboratory - I	0	0	2	2
7.	DT3677	Hemodialysis Laboratory - II	0	0	2	2
8.	DT3678	Hemodialysis Laboratory - III	0	0	2	2
TOTAL			14	3	6	23

SEMESTER VI

SL. No.	COURSE CODE	COURSE TITLE	L	T	P	C
THEORY						
1.	DT3610	Peritoneal Dialysis	3	1	0	4
2.	DT3611	Dialysis in Special Situations	3	1	0	4
3.	DT3612	Renal Disorders	3	1	0	4
4.	DT3613	Renal Transplantation	3	0	0	3
5.	BS36S0	Hospital Management	2	0	0	2
PRACTICAL						
6.	DT3679	Peritoneal Dialysis Laboratory	0	0	2	2
7.	DT3680	Dialysis in Special Situations Laboratory	0	0	2	2
8.	DT3681	Renal Disorders Laboratory	0	0	2	2
TOTAL			14	3	6	23

IV Year - Internship

One year internship finally prepares and trains the student who will be able to meticulously assist the doctors for providing quality patient care in selected areas of clinical speciality.

SEMESTER I

Sl. No	Course Code	Course Title	L	T	P	C
THEORY						
1.	EG3603	English	3	1	0	4
2.	BS3601	Anatomy	3	1	0	4
3.	BS3602	Physiology	3	1	0	4
4.	BS3603	Basic Biochemistry	3	1	0	4
5.	BS3604	Environmental Science	2	0	0	2
PRACTICAL						
6.	BS3671	Anatomy Laboratory	0	0	2	2
7.	BS3672	Physiology Laboratory	0	0	2	2
8.	BS3673	Basic Biochemistry Laboratory	0	0	2	2
Total			14	4	6	24

EG3603	ENGLISH	L	T	P	C
		3	1	0	4

OBJECTIVE

This subject deals with English language, grammar and reading comprehension

Course Outcome – COs		Cognitive Skill
At the end of the course, the students will be able to		
CO-01	Understand reading comprehension	U, A
CO-02	Learn to use applied grammar.	A
CO-03	Understand summary and bibliography.	A, U
CO-04	Understand and apply grammar and vocabulary.	U, A
CO-05	Do group discussions	A

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO \ CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	N	M	M	L	S	M	L	S	N	S	M	N	M
CO-02	M	S	L	S	N	M	S	L	N	M	M	N	S
CO-03	S	M	L	L	N	M	S	L	M	N	L	S	S
CO-04	S	S	M	S	S	M	N	S	L	N	S	L	S
CO-05	S	M	L	L	M	M	S	N	S	L	S	S	N

S- Strong, M- Medium, L-Low, N- Not Relevant

Unit I: Introduction

12

a) Study Techniques - Reading Comprehension

Exercises on reading passages and answering questions based on the passage.

b) Organization of Effective Note Taking Why good note-taking is important

Effective note-taking is an important practice to master at university. You have a lot of new knowledge and you need to develop reliable mechanisms for recording and retrieving it when necessary. But note-taking is also a learning process in itself, helping you to process and understand the information you receive.

c) Use of the Dictionary

Tips on how to use the dictionary

1. Choose the right dictionary.
2. Read the introduction.
3. Learn the abbreviations.
4. Learn the guide to pronunciation.
5. Looking Up a Word
 - a) Find the section of the dictionary with first letter of your word.
 - b) Read the guide words.
 - c) Scan down the page for your word.
 - d) Read the definition.
6. Online dictionaries
7. Research various facts.
8. Thesaurus

It is a dictionary of synonyms and antonyms, such as the online Thesaurus.com.

Enlargement of Vocabulary

Roots: A to G

Effective Diction

Foreign Expressions - meaning and pronunciation

Unit II: Applied Grammar

12

a) *Correct Usage*

The Eight Parts of Speech

1. Noun
2. Pronoun
3. Adjective
4. Verb
5. Adverb
6. Preposition
7. Conjunction
8. Interjection

b) *The Structure of Sentences*

What is a sentence? What are clauses? What are phrases?

1. Simple sentences
2. Compound sentences
3. Complex sentences

c) *The Structure of Paragraphs*

1. What is a Paragraph?

Paragraphs are comprised of sentences, but not random sentences. A paragraph is a group of sentences organized around a central topic.

2. The Secrets to Good Paragraph Writing:

Four Essential Elements

The four elements essential to good paragraph writing are: unity, order, coherence, and completeness.

A paragraph consists of 3 main structures:

- 1.Claim
- 2.Evidence
- 3.Analysis

Unit III: Written Composition

12

a) *Precise writing and Summarizing*

1. Definition of precise:

A precise or summary is an encapsulation of someone's writing or ideas.

Technically it should be one - third the length of the actual passage given.

2. Definition of summary:

Summaries may not always follow a direct line through what they're summarizing - if you want to summarize someone else's ideas in a few sentences, it might make more sense if you begin with their conclusion, and work back to the arguments they use to develop that conclusion.

Guidelines to follow while writing a summary are:

- 1) Divide and conquer.
- 2) Read.
- 3) Reread.
- 4) One sentence at a time.
- 5) Write a thesis statement.
- 6) Check for accuracy.
- 7) Revise.

b) *Writing of a Bibliography*

I. What is a bibliography?

A bibliography is an alphabetical list of all materials consulted in the preparation of your assignment.

II. What is an annotated bibliography?

An annotated bibliography is an alphabetical list of books or articles for which you have added explanatory or critical notes.

III. Why you must do a bibliography?

a) To acknowledge and give credit to sources of words, ideas, diagrams, illustrations and quotations borrowed, or any materials summarized or paraphrased.

b) To show that you are respectfully borrowing other people's ideas, not stealing them, i.e. to prove that you are not plagiarizing.

IV. What must be included in a bibliography?

- Author
- Title
- Place of publication
- Publisher

- Date of publication
- Page number(s) (for articles from magazines, journals, periodicals, newspapers, encyclopaedias , or in anthologies).

V. Writing a bibliography in MLA style

1. Standard Format for a Book:

Author. Title: Subtitle. City or Town: Publisher, Year of Publication.

If a book has no author or editor stated, begin with the title. If the city or town is not commonly known, add the abbreviation for the State or Province.

2. Standard Format for a Magazine, Periodical, Journal, or Newspaper Article:

Author. "Title: Subtitle of Article." Title of Magazine, Journal, or

Newspaper Day, Month, Year of Publication: Page Number(s).

c) ***Enlargement of Vocabulary Roots - N to S***

Unit IV: Reading and Comprehension

12

- Review of selected materials and express oneself in one's words Seminar for students on power point presentation and book review.
- Enlargement of Vocabulary
Roots - T to Z

Unit V- The study of various forms of Composition

12

a) ***Paragraph***

Exercises for students on short paragraph topics.

b) ***Essay***

How to Write an Essay

The writing of an essay has three stages:

1. Essay writing
2. Close reading
3. Research

c) ***Letter***

Mechanics of writing formal and business letters. Exercises on writing letters for students.

d) ***Summary***

Writing reports: project report, magazine article and reporting in newspapers on sporting events.

e) ***Practice In Writing***

Exercises and assignments on report writing for students.

Verbal Communication

a) **Discussions And Summarization Tips on taking minutes of a meeting Why Meeting Minutes Matter**

Meeting minutes are important. They capture the essential information of a meeting - decisions and assigned actions. The following instructions will help you take useful and concise meeting minutes.

Before the Meeting

If you are recording the minutes, make sure you aren't a major participant in the meeting. You can't perform both tasks well.

Create a template for recording your meeting minutes and make sure you leave some blank space to record your notes.

Decide how you want to record your notes. If you aren't comfortable relying on your pen and notepad, try using a tape recorder or, if you're a fast typist, take a laptop to the meeting.

During the Meeting

As people enter the room, check off their names on your attendee list. Ask the meeting lead to introduce you to meeting attendees you aren't familiar with. This will be helpful later when you are recording assigned tasks or decisions.

After the Meeting

Review the notes and add additional comments, or clarify what you didn't understand right after the meeting.

a) Debates

Group Discussions:

1. Do's in a group discussion:

- Be Confident. Introduce yourself with warm smile and get into topic soon.
- Have eye contact with all group members
- Learn to listen.
- Be polite.

Be a good team player. Move with all group members and help them when needed.

2. Don'ts in a group discussion:

- Don't be harsh when you are interrupted.
- Don't interrupt the other person
- Don't try to push your ideas on others.
- Don't argue. Everyone is free to express their ideas.

c) Oral Reports

An oral report is a presentation, usually done for a student's teacher and classmates, though it can also be done for a larger segment of the school community, for parents, or for a more open group, depending on the circumstances. For example, at a science fair, a student might present a report on his or her project periodically for the class, for other visitors who pass by, and for judges.

d) Use in Teaching Writing of dialogues

Originating from dialogues, the Greek word for conversation, the term dialogue refers to a verbal conversation between two or more people.

When writing dialogues, it is important to adhere to specific grammar rules. The following points need to be remembered while writing dialogues for role play.

1. Quotation Marks
2. Periods
3. Question Marks
4. Commas
5. Capitalization and Paragraphs
6. How Dialogue Enhances Writing

Dialogue reveals information about the speaker(s) within a written work. Dialogue also enhances the story line and plot.

a) Exposes Character Traits

Through indirect characterization, dialogue reveals details about a character by what they say, how they say it, and perhaps what they choose not to say.

b) Unveils Mood/Emotions

A character's word choice, description of tone, and choice of language reveal the inner state of the character without directly "telling" the audience.

Showing instead of telling creates a deeper understanding of the character through the eyes of the reader or audience.

c) Reveals Motivation/Influences

Dialogue can illuminate a character's internal motivation or desires.

d) Establishes Relationships

Seeing how a character addresses and responds to other characters shows the type of relationships that they form and where their relationships currently stand. Dialogue can demonstrate how relationships change throughout the course of the story. It can show how a character changes or responds to various situations.

Exercises for students on preparing a dialogue exchange between two people

- * On the street (with a vegetable vendor)
- * At college with a lecturer (regarding admissions)
- * In a bank with the manager (for opening a bank account)
- * Telephone conversation with a hotel receptionist (make room reservations)
- * Telephone conversation (taking an appointment with the dentist/doctor)

TOTAL:60 HOURS

REFERENCE BOOKS

1. "English Grammar in Use" by Raymond Murphy
2. "Practical English Usage" by Michael Swan
3. "Word Power Made Easy" by Norman Lewis

BS3601	ANATOMY	L	T	P	C
		3	1	0	4

OBJECTIVE

To deals with the concept of structure and functions of human body

Course Outcome – COs At the end of the course,the students will able to		Cognitive Skill
CO-01	Understand the organization of the Human Body	R
CO-02	Understand the locomotion and Support	U
CO-03	Understand the maintenance of the Human Body	A
CO-04	Understand the urinary system and Reproductive system	R
CO-05	Understand the control Systems of the Body	U

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	M	L	S	S	M	S	M	M	S	S	M	S	S
CO-02	S	M	M	L	S	S	M	S	S	L	M	M	S
CO-03	M	M	S	S	S	M	S	M	S	S	M	M	S
CO-04	S	S	M	M	S	M	M	S	M	M	S	S	M
CO-05	S	M	S	M	S	S	S	M	S	M	M	M	S

S- Strong, M- Medium, L-Low, N- Not Relevant

Unit I: Organization of the Human Body**12**

Introduction to the human body, Definition and subdivisions of anatomy, Anatomical position and terminology. Cell - Definition of a cell, shapes and sizes of cells, Parts of a cell - cell membranes, cytoplasm, sub cellular organelles. Cell Division - Definition and main events in different stages of mitosis and meiosis. Tissues - Tissues of the body, Definition and types of tissues, Characteristics, functions and locations of different types of tissues, Epithelial tissue - definition, classification with examples. Glands- classification with examples.

Unit II: Locomotion and Support**12**

Cartilage - Types with examples. Skeleton - Definition, axial and appendicular skeleton with names and number of bones, Types of bones. Marking of bones. Functions of bones. Development (types and ossification) and growth of bone. Name, location and general features of the bones of the body. Joints - Definition and types of joints with examples. Axes and kind of movements possible. Name, location, type, bones forming, ligaments, movements possible and the muscles producing such movements of the joints of the body. Muscular system- Parts of the skeletal muscle. Definition of origin and insertion. Classification of muscular tissue. Compartment muscles of upper limb, lower limb, sternocleidomastoid

Unit III: Maintenance of the Human Body**12**

Cardio-vascular system - Types and general structure of blood vessels. Structure and types of arteries and veins. Structure of capillaries. Shape, size, location, coverings, external and internal features of heart. Structure of heart wall. Conducting system and blood supply of the heart. The systemic arteries and veins. Name, location, branches and main-distribution of major arteries and veins. Lymphatic system- Lymph, lymphatic vessels, name, location and features of the lymphoid organs. Respiratory system-Names of organs of respiration, Location and features of nose, pharynx, larynx, trachea, bronchi, lungs and pleura. Digestive system - Names of organs of digestion. Location and features of mouth, pharynx, esophagus, stomach, small and large intestines. Location and features of salivary glands, pancreas, liver and gall bladder

Unit IV: Urinary system and Reproductive system**12**

Names of urinary organs, location and features of kidney, ureter, urinary bladder and urethra. Names of male and female organs of reproduction. Location and features of scrotum, testis, epididymis, vas deferens, seminal vesicle, ejaculatory duct, prostate gland, penis and spermatic cord. Location and features of uterus & its supports, uterine tube, ovary & mammary gland. Development - Gametes, period of gestation, gametogenesis, structure of sperm and ovum, growth of ovarian follicles, events of 1st, 2nd and 3rd weeks of development, folding of embryo. Derivatives of germ layers, placenta.

Unit V: Control Systems of the Body**12**

Nervous system - Sub-divisions of the nervous system. Brain - Sub-divisions, location external features and internal structure of medulla oblongata, pons, mid-brain, cerebellum and cerebrum. Spinal cord - Location, extent, spinal segments, external features and internal structure. Location and features of thalamus and hypothalamus. Locations and subdivisions of basal ganglia. Meninges and spaces around them. Name and location of ventricles of brain and circulation of cerebrospinal fluid. Blood supply of the brain and spinal cord. Cranial nerves. Sense organs - Location and features of the nose, tongue, eye, ear and skin. Endocrine system - Names of the endocrine glands.

Location and features of pituitary, thyroid, parathyroid, suprarenal, pancreas, ovaries and testes.
Names of hormones produced by each gland.

TOTAL: 60 HOURS

TEXT BOOKS

1. Ross and Wilson: Anatomy and Physiology in Health and illness
2. Understanding Human Anatomy and Physiology, William Davis (p) MC Graw Hill
3. Essentials of Human Embryology. Bhatnagar, Orient Blackswan Pvt. Ltd.
4. Anatomy for B.Sc Nursing by Renu Chauhan. Arichal publishing company 2012
5. Hand book of Anatomy BD Chaurasia
6. Basics in Human Anatomy for B.Sc. Paramedical Courses 1st edition 2008 Jaypee Publishers

REFERENCE BOOKS

1. B D Chaurasia: Regional Anatomy. Vol I, II, III 6th edition

BS3602	PHYSIOLOGY	L	T	P	C
		3	1	0	4

OBJECTIVE

Students will acquire knowledge in different vital systems of the body and their functions

Course Outcome – COs At the end of the course, the students will be able to,		Cognitive Skill
CO-01	Study about various systems of human body	U
CO-02	Understand functioning of various organ systems	U
CO-03	Analyze and report on experiments and observations in physiology	An
CO-04	Recognize and identify principal tissue structures	R
CO-05	Understand how these organ systems are interrelated to apply a holistic approach to human health	A

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO \ CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	S	L	S	M	M	S	S	M	S	S	M	S	M
CO-02	S	S	M	L	M	S	M	S	S	L	S	M	S
CO-03	M	S	S	S	S	M	S	M	S	S	M	M	S
CO-04	S	S	M	M	S	S	M	S	M	M	S	M	M
CO-05	S	M	S	M	S	M	S	M	S	S	M	M	S

S- Strong, M- Medium, L-Low, N- Not Relevant

Unit I: General physiology and Blood

12

General Physiology - Organization of the cell and its function, homeostasis, transport across cell membrane, Membrane Potentials - Resting Membrane Potential & Action Potential, Body Fluid Compartments - Normal Values. Blood - Introduction: composition and function of blood, Red blood cells: erythropoiesis, stages of differentiation, function, count, physiological variation. Structure, function, concentration, physiological variation, methods of estimation of haemoglobin.

White blood cells: production, function, count. Platelets: origin, normal count, morphology & functions. Plasma proteins: types, functions.

Haemostasis: definition, normal haemostasis, clotting factors, mechanism of clotting, disorders of clotting. Blood groups: ABO system, Rh system. Blood grouping & typing, cross matching. Rh system: Rh factor, Rh incompatibility. Blood transfusion: indication, transfusion reactions. Anticoagulants: classification, examples and uses. Anaemias: morphological and etiological classification, -Blood indices: CI, MCH, MCV, MCHC. Erythrocyte sedimentation rate (ESR) and packed cell volume, normal values.

Unit II: Digestive system & Respiratory system

12

Digestive System-Physiological anatomy of gastro intestinal tract, functions of digestive system. Salivary glands: structure and functions, deglutition: stages and regulation. Stomach: structure and functions. Gastric secretion: composition function regulation of gastric juice secretion. Pancreas: structure, function, composition of pancreatic juice. Functions of liver. Bile secretion, composition, function. Jaundice: types, Functions of gall bladder. Small intestine: functions, digestion, absorption, movements. Large intestine: functions, movements defecation. Respiratory system - Functions of respiratory system, physiological anatomy of respiratory system, respiratory tract, respiratory muscles. Mechanism of normal and rigorous respiration, forces opposing and favoring expansion of the lungs. Intra pulmonary & intrapleural pressure. Surface tension, recoil tendency of the thoracic cage and lungs. Transport of respiratory gases: transport of oxygen & carbon dioxide, oxy haemoglobin dissociation curve, factors affecting it. Lung volumes and capacities - normal values Regulation of respiration: mechanisms of regulation, nervous and chemical regulation, respiratory centre. Applied physiology: hypoxia, cyanosis, dyspnoea, apnoea.

Unit III: Cardiovascular and Endocrine system

12

Cardiovascular system - Heart: Physiological Anatomy, Nerve supply. Properties of cardiac muscle, cardiac cycle. Conducting System of Heart, Origin and Spread of Cardiac Impulse. Electrocardiogram (ECG) waves and normal duration. Recording. Cardiac Cycle: Phases and Volume Changes. Normal heart sounds, areas of auscultation. Pulse: jugular, radial pulse. Cardiac output: definitions of stroke volume, cardiac index, factors Affecting It. measurement of Cardiac output. General principles of circulation. Blood pressure: definition, normal value, clinical measurement of blood pressure, hypotension, hypertension. Factors affecting it and regulation. Physiological variations & regulation of heart rate. Coronary circulation. Shock. Endocrine System - Classification of endocrine glands & Definition of hormone. Pituitary hormones: anterior and posterior pituitary hormones, secretion, functions. Thyroid gland: physiological anatomy, hormone secreted, physiological function, regulation, secretion, disorders (hypo and hyper secretion of hormone). Adrenal cortex: physiological anatomy. cortical hormones, functions and regulation. Adrenal medulla: hormones, regulation and secretion. Functions of adrenaline and nor adrenaline. Hormones of pancreas. Insulin: secretion, regulation, function and action. Diabetes mellitus: regulation of blood glucose level. Parathyroid gland: function, action, regulation of secretion of parathyroid hormone. Calcitonin.

Unit IV: Excretory system and Reproductive system

12

Excretory System - Functional anatomy of kidney. Juxta glomerular apparatus: structure and function. Glomerular filtration. Tubular function (reabsorption and secretion). Micturition, innervation of bladder, cystometrogram. Artificial kidney, renal function tests skin and body temperature. Reproductive system – Male reproductive system: functions of testes,

spermatogenesis: Endocrine functions of testes -Female reproductive system: oestrogen, progesterone, menstrual cycle: ovulation, physiological changes during pregnancy, pregnancy tests. Lactation: composition of milk, factors controlling lactation.

Unit V: Muscle nerve physiology, Nervous system and Special senses

12

Muscle nerve physiology - Classification and properties of neuron and neuroglia. Classification of nerve fibers. Classification of muscle, structure of skeletal muscle, neuromuscular junction. Transmission across nmj. Excitation contraction coupling. Muscle tone, fatigue, rigor mortis. Nervous system - Organisation of nervous system. Synapse: structure, types, properties. Receptors: definition, classification, properties. Sensations-pain. Organization Spinal cord. Ascending tracts, descending tracts. Reflex: definition reflex arc, clinical classification of reflexes: Babinski's sign. Hypothalamus- functions. Cerebral cortex lobes – functions. Cerebellum- functions. Basal ganglia functions. Cerebro Spinal Fluid (CSF): formation, circulation & reabsorption, composition and functions. Lumbar puncture. Autonomic Nervous System: Sympathetic and parasympathetic distribution. Special senses - Vision: structure of eye, function of different parts. Structure of retina. Visual pathway, errors of refraction. Hearing: structure and functions of ear. Taste: taste buds and taste pathway. Olfaction : receptors, pathway.

TOTAL: 60 HOURS

TEXT BOOKS

1. A.K.Jain, Human Physiology and Biochemistry for Physical Therapy and Occupational Therapy, 1st Ed. Arya Publication.
2. Dr.Venkatesh.D and Dr.SudhakarH.S.Basic of Medical Physiology, 2nd Ed., Wolter-Kluwer Publication.
3. Chaudhari (Sujith K) Concise Medical Physiology 6th Ed. New Central Book.

REFERENCE BOOKS

1. A.K.Jain, Text book of Physiology for Medical Students, 4th Ed. Arya Publication.
2. Guyton (Arthur) Text Book of Physiology.11th Ed. Prism Publishers.
3. Ganong (William F) Review of Medical Physiology. 23rd Ed . Appleton.

BS3604	BASIC BIOCHEMISTRY	L	T	P	C
		3	1	0	4

OBJECTIVE

Study about the biomolecules involved in clinical laboratory.

Course Outcome – COs		Cognitive Skill
At the end of the course,the students will able to,		
CO-01	Chemistry of Cell & Chemistry of Carbohydrates, Proteins, Lipids &Nucleotides	R
CO-02	The Enzymes & Acid base balance	U
CO-03	The Vitamins & Minerals	U
CO-04	The Nutrition, Blood chemistry & Urine Chemistry	R,A
CO-05	Know about Clinical Biochemistry	U,E

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO- A	PO- B	PO- C	PO- D	PO- E	PO- F	PO- G	PO- H	PO- I	PO- J	PO- K	PO- L	PO-M
CO-01	S	N	M	M	S	N	M	M	M	S	L	L	M
CO-02	M	M	M	L	S	N	M	M	M	S	M	N	M
CO-03	S	M	S	M	M	N	M	M	N	S	N	M	N
CO-04	M	N	M	L	S	N	M	M	M	S	N	L	M
CO-05	N	M	M	M	M	N	M	N	S	M	L	M	M

S- Strong, M- Medium, L-Low, N- Not Relevant

Unit I : Chemistry of Cell & Chemistry of Biomolecules

12

Cell- Structure & Function of Cell Membrane, Subcellular Organelles and their Functions. Carbohydrates- Definition, Classification & Biological importance of carbohydrates, Proteins- Definition & Classification of amino acids & Proteins, Biologically important peptides, Plasma proteins, Immunoglobulins. Lipids- Definition, Classification & Biological importance and Functions of Lipids. Nucleotides- Structure and Functions of DNA & RNA. Biologically important nucleotides.

Unit II: Enzymes & Acid Base Balance

12

Enzymes- Definition and Classification. Factors affecting enzyme activity. Coenzymes and Cofactors. Enzyme inhibition & Regulation of enzyme activity. Acid Base balance- Acids, Bases & Body Buffers, Regulation of pH, Acid base disorders.

Unit III : Vitamins & Minerals

12

Vitamins- Classification, Sources, RDA, Functions (in brief), deficiency manifestations and hypervitaminosis. Minerals- Classification, Sources, RDA, Functions (in Brief), deficiency manifestations of the following: calcium, phosphorous, iron, copper, iodine, zinc, fluoride, sodium, potassium and chloride.

Unit IV : Blood chemistry & Urine Chemistry

12

Blood chemistry- Biochemical components – Plasma, Red blood cells, white blood cells, platelets, Complete blood count. Reference ranges in normal- Blood, Serum, Plasma, CSF and Hematologic. Diseased states- Diabetes, Anemia, Jaundice. Benedict's method, glucose tolerance test, renal threshold for glucose, glycogen storage diseases, lactosuria, ketonemia and ketonuria. Urine chemistry- Biochemical components – Reference ranges in normal - Diseased state- Proteinuria, oliguria, Polyuria, Glycosuria, Hematuria.

Unit V : Clinical Biochemistry

12

Specimen Collection- Blood, Urine and Body fluids. Preanalytical, analytical and postanalytical errors. Clinical Biochemistry- Parameters to diagnose Diabetes & Cardiovascular diseases. Diagnostic enzymology, Assessment of arterial Blood gas status and electrolyte balance, Point of Care Testing. Renal Function tests (in brief), Liver function tests (in brief).

TOTAL: 60 HOURS

TEXT BOOKS

1. Textbook of Biochemistry – Naik Pankaja- Published by Jaypee brothers medical, 2nd edition (1 January 2017)
2. Biochemistry – Voet D and Voet J G Published by Wiley, 4th edition (27 April 2012)

3. Clinical Biochemistry-R LuxtonPublishedby Hodder Arnold,3rd edition (2 july 1999)
4. Textbook of Medical Biochemistry-Chatterjea and ShindePublishedby JPB publisher, 8th edition (1 January. 2012)
5. Textbook of Clinical Chemistry-TerronForrePublishedby Random experts, 2nd Edition (1 January 2013)

REFERENCE BOOKS

1. Harpers Biochemistry By Murray R KPublishedby Tata Mc Graw hill, 31st edition 2021)
2. Clinical Biochemistry-S S HaquePublishedby New Delhi publishers 1st edition (31 August 2021)
3. Textbook of Biochemistry-Rafi M.DPublishedbyThe Orient Black swan, 3rd edition (1sr January 2017)
4. Reference guide to blood chemistry analysis- Dicken, RichardPublishedby Bear mountain, 1st edition (5 September 2014)
5. Practical Clinical Biochemistry-Harold VarleyPublishedby CBS publisher, 4th edition (1st January 2005).

BS3604		L	T	P	C
	Environmental Science	2	0	0	2

OBJECTIVE

To know various Environmental factors of Health

Course Outcome – COs At the end of the course,the students will able to,		Cognitive Skill
CO-01	Apprehends the concepts of EVS, its relationship and impacts with health and studies about the importance of safe and pure water, pollution and purification method	U
CO-02	Understands the properties, sources, biological effects and the monitoring, prevention & control of air, light, noise and radiation	R & U
CO-03	Learns the various methods of disposing solid and excreta wastes and the modern sewage systems to improvise proper sanitation and health of public	R
CO-04	Acquire knowledge about the importance of good standard housing as it influence health greatly and the medical entomology	R & U
CO-05	Know about the types, mechanism of action , dosage and application of insecticides to control insects and rodents which impacts health ultimately	R

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	L	S	M	L	L	S	S	S	L	L	M	M	S
CO-02	L	S	M	L	L	S	S	S	L	L	M	M	S
CO-03	L	S	M	L	L	S	S	S	L	L	M	M	S

CO-04	L	S	M	L	L	S	S	S	L	L	M	L	S
CO-05	L	S	M	L	L	S	S	S	L	L	M	L	S

S- Strong, M- Medium, L-Low, N- Not Relevant

Unit I: Environment, Health and Water

6

Introduction to Environment and Health and Water- Ecological definition of Health, Population perspective of relations, Health & environment perspective of relations, Environmental factors, Environmental Sanitation, Need to study environmental health, Predominant reasons for ill-health in India. Water - Safe and wholesome water, requirements, uses, sources; sanitary well; Hand pump; water Pollution; Purification of water; large scale & small scale; slow sand filters; rapid sand filters; Purification of Water on a small scale; Household purification, Disinfection of wells; water quality criteria & standards.

Unit II: Air, Light, Noise, Radiation

6

Air- Composition, Indices of Thermal Comfort, Air pollutants, Air Pollution - Health Effects, Environmental Effects, Green-house effect, Social & Economic Effects, Monitoring, Prevention & Control. Light, Noise, Radiation. Natural and Artificial light; Properties, sources, noise pollution and its control, types, sources, biological effects and protection.

Unit III: Waste and Excreta Disposal

6

Disposal of Wastes - Solid Wastes, Health hazards, Methods of Disposal; Dumping, Controlled tipping/ sanitary landfill, Incineration, Composting. Excreta Disposal - Public health importance, Health hazards, sanitation barrier, Methods of excreta disposal, unsewered areas and sewerage areas, sewage, Modern Sewage Treatment.

Unit IV: Housing and Health and Medical

6

Housing and Health - Human Settlement, Social goals of housing, Criteria for Healthful Housing by Expert Committee of the WHO, Housing standards- Environmental Hygiene Committee, Rural Housing Standards, Overcrowding, Indicators of Housing. Medical Entomology - Classification of Arthropods, Routes of Disease transmission, Control measures.

Unit V : Insecticides and Rodents

6

Insecticides - Types, mechanism of action, dosage and application for control of insects. Rodents - Rodents and its importance in disease, along with anti-rodent measures.

TOTAL: 30 HOURS

REFERENCE BOOKS

- 1) Park K. Park's Textbook of Preventive and Social Medicine. 23rd ed. Jabalpur: BanarsidasBhanot Publishers; 2015. p.135-141
- 2) Suryakantha. Textbook of Community Medicine with recent advances. 4th edition.
- 3) Bhalwar R. Textbook of Public Health and Community Medicine. 2nd edition. Pune: Department of Community Medicine AFMC, 2012
- 4) Essentials of Community Medicine for Allied Health Sciences, JSS University Publications, 2015.

BS3671	ANATOMY LABORATORY	L	T	P	C
		0	0	2	2

OBJECTIVE

It deals with various anatomical studies about various systems in the body.

Course Outcome – COs At the of the course,the students will able to,		Cognitive Skill
CO-01	Understand the parts of microscope and its uses, skeleton and joint	R
CO-02	Demonstrate the deltoid and gluteus maximus, Cubital fossa	U
CO-03	Demonstrate the heart and its blood supply, demonstration of major arteries of upper limb and lower limb, histology of cardiac muscle and histology of vessels	A
CO-04	Demonstrate the location and features of kidney, ureter, urinary bladder and urethra. Histology of urinary system except urethra	R
CO-05	Determine the histology of cornea and retina	U

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	S	M	S	S	M	S	S	M	S	S	M	S	S
CO-02	S	S	M	L	M	S	M	S	S	L	S	M	S
CO-03	M	S	S	S	S	M	S	M	S	S	M	M	S
CO-04	S	S	M	M	S	S	M	S	M	M	S	M	M
CO-05	S	S	S	M	S	M	S	M	S	S	L	M	S

S- Strong, M- Medium, L-Low, N- Not Relevant

Practicals

- 1) Demonstration of parts of microscope and its uses
- 2) Demonstration of skeleton and joint
- 3) Demonstration of deltoid and gluteus maximus, Cubital fossa
- 4) Demonstration of heart and its blood supply, demonstration of major arteries of upper limb and lower limb, histology of cardiac muscle and histology of vessels
- 5) Demonstration of location and parts of lungs, histology of trachea and lungs
- 6) Demonstration of location of stomach, small and large intestines. Location and features of pancreas, liver and gall bladder
- 7) Demonstration of location and features of kidney, ureter, urinary bladder and urethra. Histology of urinary system except urethra
- 8) Demonstration of location of male and female reproductive organs
- 9) Demonstration of brain and spinal cord
- 10) Histology of cornea and retina

TOTAL: 30HOURS

BS3672	PHYSIOLOGY LABORATORY	L	T	P	C
		0	0	2	2

OBJECTIVE

To study about physiological systems of body

Course Outcome – COs At the end of the course,the students will able to,		Cognitive Skill
CO-01	Understand and perform estimation of haemoglobin	U
CO-02	Analyze the blood groups	An
CO-03	Determination of bleeding time and clotting time	U
CO-04	Evaluate the principles of haemocytometer	E
CO-05	Learn various blood pressure recording methods	A

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Practicals

- 1) Haemoglobinometry.
- 2) Haemocytometry
- 3) Total leucocyte count.
- 4) Total Red blood cell count.
- 5) Determination of blood groups.
- 6) Differential WBC count.
- 7) Determination of clotting time, bleeding time.
- 8) Erythrocyte sedimentation rate (ESR). Determination of packed cell Volume, Calculation of Blood indices: CI, MCH, MCV, MCHC.
- 9) Blood pressure recording.
- 10) Spirometry, Artificial Respiration

TOTAL: 30 HOURS

BS3673	BIOCHEMISTRY LABORATORY	L	T	P	C
		0	0	2	2

OBJECTIVE

To study about the laboratorial values and experiments related to biochemistry

Course Outcome – COs At the end of the course,the students will able to,		Cognitive Skill
CO-01	Chemistry of cell and chemistry of carbohydrates ,proteins ,lipids	U
CO-02	Know about enzymes and acid base balance	An
CO-03	Know about vitamins and minerals	U
CO-04	Deals with the nutrition,blood chemistry and urine chemistry	E
CO-05	Know about clinical biochemistry	A

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	S	N	M	M	S	N	M	M	M	S	L	L	M
CO-02	M	M	M	L	S	N	M	M	M	S	M	N	M
CO-03	S	M	S	M	M	N	M	M	N	S	N	M	N
CO-04	M	N	M	L	S	N	M	M	M	S	N	L	M
CO-05	N	M	M	M	M	N	M	N	S	M	L	M	M

S- Strong, M- Medium, L-Low, N- Not Relevant

Practicals

- 1) General Reactions of Carbohydrates.
- 2) Color reactions of Proteins.
- 3) Reactions of Non Protein nitrogenous substances.
- 4) Demonstration of pH meter, Colorimeter and spectrophotometer.
- 5) Demonstration of Chromatography and Electrophoresis.

TOTAL: 30 HOURS

SEMESTER II

Sl. No	Course Code	Course Title	L	T	P	C
THEORY						
1.	BS3605	General Pathology	3	1	0	4
2.	BS3606	Microbiology	3	1	0	4
3.	BS3607	Pharmacology	3	1	0	4
4.	BS3608	Psychology	2	0	0	2
5.	BS3609	Introduction to Computer	2	0	0	2
PRACTICALS						
6.	BS3674	Pathology Laboratory	0	0	2	2
7.	BS3675	Microbiology Laboratory	0	0	2	2
8.	BS3676	Pharmacology Laboratory	0	0	2	2
TOTAL			13	3	6	22

BS3605	GENERAL PATHOLOGY	L	T	P	C
		3	1	0	4

OBJECTIVE

To deals with the concepts of Clinical Pathology,

Course Outcome – COs At the end of the course,the students will able to,		Cognitive Skill
CO-01	Exposure to a knowledge on introduction and scope of pathology	R
CO-02	Understanding on the learning about types of hematological disorders	U
CO-03	Analyze on basic hematological techniques.	U

CO-04	Students will learn about transfusion medicine.	R,A
CO-05	To understand about clinical pathology.	U,E

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO- A	PO- B	PO- C	PO- D	PO- E	PO- F	PO- G	PO- H	PO- I	PO- J	PO- k	PO - L	PO-M
CO-01	S	N	M	M	S	N	M	M	M	S	L	L	M
CO-02	M	M	M	L	S	N	M	M	M	S	M	N	M
CO-03	S	M	S	M	M	N	M	M	N	S	N	M	N
CO-04	M	N	M	L	S	N	M	M	M	S	N	L	M
CO-05	N	M	M	M	M	N	M	N	S	M	L	M	M

S- Strong, M- Medium, L-Low, N- Not Relevant

Unit I: Introduction- & scope of pathology

12

Cell injury and Cellular adaptations - Normal cell, Cell injury - types, etiology, morphology, Cell death-autolysis, necrosis, apoptosis, Cellular adaptations-atrophy, hypertrophy, hyperplasia, metaplasia. Inflammation-Introduction, acute inflammation-vascular events, cellular events, chemical mediators, chronic inflammation-general features, granulomatous inflammation, tuberculosis. Healing and repair - Definition, different phases of healing, factors influencing wound healing, fracture healing. Haemodynamic disorders-Oedema, hypermia, congestion, haemorrhage, embolism, thrombosis, infarction. Neoplasia - definition, nomenclature, features of benign and malignant tumors, spread of tumors, dysplasia, carcinoma in situ, precancerous lesions. Environmental and nutritional pathology - smoking, radiation injury, malnutrition, obesity, vitamin deficiencies.

Unit II: Haematological Disorders

12

Introduction and Haematopoiesis. Anaemia - introduction and classification (morphological and etiological), iron deficiency anemia: distribution of body iron, iron absorption, causes of iron deficiency , lab findings, megaloblastic anemia: causes, lab findings, haemolytic anemias: definition. Causes, classification and lab findings. WBC disorders - quantitative disorders, leukemia - introduction and classification, acute leukemias, chronic leukemias. Bleeding disorders - introduction, physiology of hemostasis. Classification, causes of inherited and acquired bleeding disorders, thrombocytopenia, DIC, laboratory findings. Pancytopenia.

Unit- III: Basic Hematological Techniques

12

Characteristics of good technician, Blood collection - methods (capillary blood, venipuncture, arterial puncture) complications, patient after care, anticoagulants, transport of the specimen, preservation, effects of storage, separation of serum and plasma, universal precautions, complete hemogram - CBC, peripheral smear, BT, CT, PT, APTT, ESR, disposal of the waste in the laboratory.

Unit IV: Transfusion Medicine**12**

Selection of donor, blood grouping, Rh typing, cross matching, storage, transfusion transmitted diseases, transfusion reactions, components - types, indications.

Unit V: Clinical Pathology**12**

Introduction to clinical pathology - collection, transport, preservation, and processing of various clinical specimens. Urinalysis - collection. Preservatives, physical, chemical examination and microscopy. Physical examination; volume, color, odor, appearance, specific gravity and ph, Chemical examination; strip method- protein - heat and acetic acid test, sulfosalicylic acid method, reducing sugar-benedicts test, ketone bodies - rotheras test, bile pigments fouchet method, bile salt - hays method, blood - benzidine test, urobilinogen and porphobilinogen - ehrlich aldehyde and schwartz test, bence jones protein., microscopy.

Examination of cerebrospinal fluid - physical examination, chemical examination, microscopic examination, examination of body fluids (pleural, pericardial and peritoneal), physical examination, chemical examination, microscopic examination, sputum examination.

TOTAL: 60 HOURS**TEXT BOOKS**

- 1) Basic Pathology Robbins Saunders, an imprint of Elsevier Inc., Philadelphia, USA.
- 2) Text book of Pathology HarshaMmohanJaypee Brothers, New Delhi.
- 3) Practical Pathology P. Chakraborty, GargiChakarborty New Central book agency, Kolkata.
- 4) Text book of Haematology Dr Tejinder Singh Arya Publications, Sirmour (H P)
- 5) Text book of Medical Laboratory Technology PrafulGodkarBhalani Publications house, Mumbai.

BS3606	MICROBIOLOGY	L	T	P	C
		3	1	0	4

OBJECTIVE

To learn basic sterilization methods, know the importance of immunity and understand various pathogens.

Course Outcome At the end of the course, students should be able to,		Cognitive Skill
CO-01	Knowledge in sterilization and know the importance of immunity.	U, R,A
CO-02	Understand and identify common bacterial infectious agents and the disease that they cause.	U,R,An
CO-03	Learn basic diagnostic methods, treatment for mycobacterium and parasitic infections	U,R,An
CO-04	Know the morphology and diagnostics methods for various fungal infections.	An, R
CO-05	Understand the interaction between viruses and its host and know the preventive measures of viruses.	U, R

R- Remember, U – Understand, A – Apply, An – Analyze, E – Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO -A	PO- B	PO - C	PO -D	PO - E	PO- F	PO -G	PO -H	PO - I	PO- J	PO- k	PO - L	PO- M
CO-01	S	S	S	M	L	M	M	N	N	M	S	S	S
CO-02	S	S	S	L	S	N	M	N	L	S	S	M	S
CO-03	S	S	S	M	M	M	M	N	N	M	S	M	S
CO-04	S	S	S	S	M	M	S	N	L	S	M	M	S
CO-05	S	S	S	M	L	L	M	N	N	S	S	M	S

S- Strong, M- Medium, L-Low, N- Not Relevant

Unit I: General Microbiology

12

History of Microbiology. Sterilization and Disinfection - Principles and use of equipment's of sterilization namely hot air oven, autoclave and serum inspissator, pasteurization, antiseptics and disinfectants. Immunology - Antigen, Antibodies, Immunity, Vaccines and immunization schedule. Hospital acquired infection - Causative agents, transmission methods, investigation, prevention and control of hospital acquired infections.

Unit II: Bacteriology

12

Morphology, infections, lab diagnosis, treatment and prevention of common bacterial infections - Staphylococcus, Streptococcus, Neisseria, Corynebacterium diphtheriae, Clostridia, Shigella, Salmonella, Klebsiella, E.coli, Proteus, Vibrio cholerae, Pseudomonas.

Unit III: Mycobacteriology & Parasitology

12

Mycobacteria- Morphology, pathogenesis, lab diagnosis, treatment and prevention. Morphology, infections, lab diagnosis, treatment and prevention of following parasites - Entamoeba, Giardia, Malaria, Hookworm, Roundworm and Filarial worms.

Unit IV: Mycology

12

Morphology, disease caused and lab diagnosis of following fungi - Candida, Cryptococcus, Dermatophytes, Opportunistic fungi (Aspergillus, Zygomycetes and Penicillium).

Unit V: Virology

12

General properties of viruses, diseases caused lab diagnosis and prevention of following viruses - Hepatitis, HIV, Dengue, Influenza, Chikungunya, Rabies, Corona and Poliomyelitis.

TOTAL:60 HOURS

TEXT BOOKS

- 1) Anathanarayana&Panikar: Medical Microbiology - Revised 8th edition University Press.
- 2) Parasitology by Chatterjee - Interpretation to Clinical Medicine.
- 3) Textbook of Microbiology - Baveja, 5th edition, Arya Publications.

REFERENCE BOOKS

1. Microbiology by Prescott L M, J P Harley and D A Klein, 2005. Sixth edition, International edition, Mc Graw Hill.
2. Microbiology by Pelczar TR M J Chan ECS and Kreig N R, 2006. Fifth edition, Tata Mc Graw-Hill INC. New York.

BS3607	PHARMACOLOGY	L	T	P	C
		3	1	0	4

OBJECTIVE

Describe the General Pharmacology and Blood, basic technical terminology of Chemotherapy, Hormones

Course Outcome – COs At the end of the course, the students will be able to,		Cognitive Skill
CO-01	Understand regarding the general pharmacology including pharmacokinetics and pharmacodynamics of adrenal drugs	R
CO-02	Enlist skeletal muscle relaxants, ionotropic drugs, antihypertensives and diuretics	U
CO-03	Understand regarding general anesthetics, antiepileptics, opioids analgesics and NSAIDs	A
CO-04	Enhance their knowledge on chemotherapeutic drugs	R
CO-05	List out antibiotics, antifungal, antiviral and hormonal drugs	U

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO \ CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	L	S	M	S	S	M	S	S	L	S	S	M	S
CO-02	L	S	M	S	M	M	S	S	L	M	M	M	S
CO-03	L	S	M	S	M	S	S	S	M	S	S	L	S
CO-04	L	S	M	S	S	M	S	S	L	M	M	M	S
CO-05	L	S	M	S	M	M	S	S	L	S	S	M	S

S- Strong, M- Medium, L-Low, N- Not Relevant

Unit I: General Pharmacology, ANS, PNS.

12

Sources of Drugs. Route of drug administration. Pharmacokinetics (Absorption, Metabolism, Distribution, Excretion). Pharmacodynamics (Mechanisms of action) Adverse drug reactions. ANS ADRENERGIC Drugs - Adrenaline, Noradrenaline, Ephedrine, Dopamine, Dobutamine. Anti adrenergic - Phentolamine, Phenoxybenzamine, Prazocin, Tamsulosin, Propranolol, Atenolol, Carvedilol. Cholinergic drugs-Acetyl choline, Pilocarpine, Neostigmine, Organophosphorous compounds. Anti cholinergic agents-Atropine, Glycopyrrolate, Ipratropium Bromide, Dicyclomine

Unit II: PNS, CVS, Renal System**12**

Skeletal muscle relaxants - D Tubocurarine, Succinyl choline, Diazepam. Dantrolene Local anaesthetics - lignocaine, la + vasoconstrictor CVS - ionotropic agents - Digoxin, Antianginal drugs - GTN, Antihypertensives - Betablockers (Propranolol, Atenolol, carvedilol), CCBs (Nifedipine), Diuretics (Thiazide, Furosemide, ace inhibitors, ARBs, Clonidine Drugs used in treatment of different types of shock, Plasma expanders Renal system - Diuretics Furosemide, Thiazide, Spiranolactone Antidiuretics - Vasopressin

Unit III: CNS, Blood**12**

CNS - general Anaesthetics - nitrous oxide, Halothane, iv anaesthetics. Sedative hypnotics - diazepam, barbiturates, zolpidem. Antiepileptics - Phenytoin, carbamazepine, phenobarbitone, valproate. Opioid analgesics - morphine, pethidine, codeine. NSAIDS - Aspirin, Diclofenacibuprofen, Selective COX2 inhibitors. Respiratory system-treatment of cough And Bronchial asthma. Blood - Hematinics, Anticoagulants - Warfarin, Heparin Thrombolytics& Antiplatelet drugs - streptokinase, aspirin, clopidogrel.

Unit IV: GIT, Chemotherapy**12**

GIT - drugs used in peptic ulcer - ppi, H2 blockers, Antacids Antiemetics - Metaclopramide, Domperidone, Ondansetron Purgatives & Laxatives-bran, ispaghula, Lactulose, Bisacodyl&senna Drugs used in Diarrhoea- ORS, Super ORS, Antimotility drugs (loperamide, diphenoxylate). Chemotherapy - general considerations MOA, Resistance, Prophylaxis Sulfonamides, cotrimoxazoles, Quinolones Tetracyclines, chloramphenicol. Betalactam antibiotics

Unit V: Chemotherapy, Hormones**12**

Aminoglycosides, Macrolides, other antibiotics (vancomycin, linezolid) & treatment of UTI Antifungal (clotrimazole, flucanazole), Antiviral (Acyclovir, Few drugs used in HAART), Cancer chemotherapy (names, common Adverse effects, general principles in the treatment of cancer) Hormones - Corticosteroids its uses and adverse effects, Treatment of Diabetes mellitus(insulin, Metformin, Glibenclamide).

TOTAL: 60 HOURS**TEXT BOOKS**

- 1) K.D. Tripathi, Essentials of Medical Pharmacology, V. Edition, M/s. Jaypee Brothers, Post Box, 7193, G-16, Emca House, 23/23, Bansari Road, Daryaganj, New Delhi.
- 2) PadmajaUdaykumar -Pharmacology for Allied Sciences.
- 3) R.S. Satoskar, S.D. Bhandarkar, S.S. Ainapure, Pharmacology and Pharmacotherapeutics, 18th edition, Single Volume, M/s Popular Prakashan, 350, Madan Mohan Marg, Tardeo, Bombay - 400 034.

BS3608	PSYCHOLOGY	L	T	P	C
		2	0	0	2

OBJECTIVE

After studying this applied paper, at the end of the semester students shall be able to demonstrate and develop the skills to understand patients better in the respective field.

Course Outcome – COs At the end of the course, the students will be able to,		Cognitive Skill
CO-01	Get a clear picture about the basic of psychology, scope, branches and history of psychology and understands the concept of normality and abnormality	U & A
CO-02	Develop a knowledge about the classification, signs, symptoms and management of psychological disorders like anxiety, panic, phobia, OCD and PTSD	U & A
CO-03	Will be prepared to manage stress as they learn about how stress impairs a normal life style and health. Students learn about the stress and the models provided by Hans Selye and Lazarus & Folkman	U & A
CO-04	Study about the process of learning proved by scientists Ivan Pavlov and Skinner in the psychological perspectives	R
CO-05	Learn about the therapeutic techniques, the concept of counselling and relaxation techniques	U & A

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	L	S	M	M	L	S	S	S	S	S	S	L	S
CO-02	L	S	M	M	M	S	S	S	S	M	M	L	S
CO-03	L	S	M	L	L	S	S	S	S	M	M	L	S
CO-04	L	M	M	M	L	M	M	M	M	M	M	L	
CO-05	L	M	M	M	M	S	S	S	S	S	S	M	S

S- Strong, M- Medium, L-Low, N- Not Relevant

Unit I:

6

Introduction to Psychology; Meaning and Definitions psychology. Evolution of modern psychology. Scope of Psychology. Branches of psychology. Concept of normality and abnormality.

Unit II:

6

Identifying psychological disorders. Anxiety disorders (panic, phobia, OCD, PTSD signs symptoms and management).

Unit III:

6

Stress, Hans Selye Model of stress. Lazarus and Folkman model of stress. Sources of stress. Stress, disease and health. Changing health- impairing behavior.

Unit IV:

6

Learning; Meaning, definition, Theories of learning .Pavlov's classical conditioning, Skinner's operant conditioning.

Unit V:**6**

Therapeutic Techniques. Counselling-meaning and definition. Psychotherapy- meaning and definition. Relaxation-types. (Brief introduction to psychoanalytical, behavioral and cbt techniques)

TOTAL: 30 HOURS**TEXT BOOKS**

- 1) C.P. Khokhar (2003) Text book of Stress Coping and Management Shalab Publishing House.
- 2) S.M.Kosslyn and R.S.Rosenberg (2006) Psychology in Context. Pearson Education Inc.
- 3) C.R. Carson, J.N. Bitcher, S.Mineka and J.M. Hooley (2007), Abnormal Psychology 13th, Pearson Education, Inc.
- 4) D.A. Barlow and V.M. Durand (2004) Abnormal Psychology Wadsworth, Thompson Learning, 3rd edition USA.
- 5) R.J. Gerrig & P.G. Zimbardo (2006) Psychology and life, Pearson Education, Inc.
- 6) Pestonjee, D.M. (1999). Stress & Coping, The Indian Experience 2nd edn. New Delhi, Sage India Publications. University Publications, 2015.

BS3609	INTRODUCTION TO COMPUTER	L	T	P	C
		2	0	0	2

OBJECTIVE

To deals with the concepts of the Computer and its Functions.

Course Outcome – COs At the end of the course, the students will able to,		Cognitive Skill
CO-01	Remember with the basic concepts of computer and its history	R
CO-02	Understand the computer hardware, various types of storage devices and parts of computer.	U
CO-03	Understand the computer memory.	U
CO-04	Familiar with the file management, application software packages used and various types of application softwares	R,A
CO-05	Understand the basics of operating system and evaluate the number system.	U,E

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO \ CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	S	N	M	M	S	N	M	M	M	S	L	L	M
CO-02	M	M	M	L	S	N	M	M	M	S	M	N	M
CO-03	S	M	S	M	M	N	M	M	N	S	N	M	N
CO-04	M	N	M	L	S	N	M	M	M	S	N	L	M
CO-05	N	M	M	M	M	N	M	N	S	M	L	M	M

S- Strong, M- Medium, L-Low, N- Not Relevant

Unit I:**6**

Functionalities of a computer, Definition, Advantages, Disadvantages. Applications - Banking, Insurance, Education, Marketing, HealthCare, Engineering Design, Military, Communication, Government. Generations - First Generation, Second Generation, Third Generation, Fourth Generation, Fifth Generation. Types of Computer - PC (Personal Computer), Workstation, Minicomputer, Mainframe, Supercomputer.

Unit II:**6**

Components - Input Unit, CPU, (Central Processing Unit) Output Unit. CPU - Central Processing Unit, Memory or Storage Unit, Control Unit, ALU (Arithmetic Logic Unit), Arithmetic Section, Section Logic. Input Devices - Keyboard, Mouse, Joystick, Light Pen, Track Ball, Scanner, Digitizer, Microphone, Magnetic Ink, Card Reader (MICR), Optical Character Reader(OCR), Bar Code Readers, Optical Mark Reader(OMR). Output Devices - Monitors, Cathode-Ray Tube (CRT) Monitor, Flat-Panel Display Monitor, Printers, Impact Printers, Character Printers, Dot Matrix Printer, Daisy Wheel, Printers Line, Printer Drum, Printer Chain, impact Non- Printers, Printers Laser, Inkjet Printers.

Unit III:**6**

Memory - Cache Memory, Primary Memory, (Main Memory) Secondary Memory. Random Access Memory - Static RAM (SRAM), Dynamic RAM (DRAM). Read Only Memory - MROM (Masked ROM), PROM (Programmable Read only Memory), EPROM (Erasable and Programmable Read Only Memory) EEPROM (Electrically Erasable and Programmable Read Only Memory) Advantages of ROM. Mother board - Features of Mother board, Popular Manufacturers, Description of Mother board.

Unit IV:**6**

Ports - Port Serial, Port Parallel, Port PS/2, Port VGA, Power Connector, Port Firmware, Port Modem, Ethernet Port, Port Game, Digital Video Interface, DVI port, Sockets. Hardware - Relationship between Hardware and Software. Software - System Software, Application Software, Emerging trends in IT-introduction, E-commerce, mobile communication, global positioning system(GPS), infrared Communication, smart card, artificial intelligence in health care.

Unit V:**6**

Documentation using MS Word- Introduction to office automation, Creating and editing worksheet, Formatting document, Auto test, Autocorrect, spelling and grammar tool, document, Template. MS Excel- Introduction to MS Excel, formulas and functions, Charts, advance features of MS Excel. MS PowerPoint- Presentation, creating and manipulating slides, Inserting recorded sound effect or Inbuild sound effect.

TOTAL: 30 HOURS**REFERENCES BOOKS**

1. Introduction to computer by Gilbert Brands, 2010. PHI Learning Pvt Ltd, New Delhi, First edition.
2. Advances in Computer science and Information Technology by HojattAdeli, 2003, New Age International (P), Ltd.
3. Computer organisation and Architecture, Rajaraman V, Radhakrishnan.T., 2001. First edition. PHI Learning Private Limited, New Delhi.

4. Computer Science, Robert Sedgewick, Kevin Wayne, 2012. PHI Learning Pvt Ltd, New Delhi, First edition.
5. Computer Fundamentals, P K Sinha & Priti Sinha, 2015, New Age International (P), Ltd, Fourth Edition.

BS3674	PATHOLOGY LABORATORY	L	T	P	C
		0	0	2	2

OBJECTIVE

To deals with the Concepts of Hematological Techniques and Diagonosis of the diseases.

Course Outcome – COs At the end of the course,the students will able to,		Cognitive Skill
CO-01	Understanding the concerned techniques for blood collection	U
CO-02	Acquire knowledge about hematological techniques	A
CO-03	Enables to understand the indications and procedure involved in blood transfusion	U
CO-04	Able to gain basic knowledge of morphology of blood cells	A
CO-05	Enhanced with the basic knowledge of collection and examination of CSF	E

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	S	N	M	M	S	N	M	M	L	S	L	L	M
CO-02	M	M	M	L	S	N	M	L	M	S	M	N	M
CO-03	S	L	S	M	M	N	L	M	N	S	N	M	N
CO-04	M	N	M	L	S	N	M	M	M	S	N	M	M
CO-05	N	M	L	M	L	N	M	N	S	M	L	M	L

S- Strong, M- Medium, L-Low, N- Not Relevant

Practicals

1. Laboratory organization.
2. Reception of specimen, dispatch of reports, records keeping, coding of cases.
3. Laboratory safety guidelines.
4. SI units and conventional units in hospital laboratory.
5. Haematology techniques
6. Basic requirements for hematology laboratory
7. Glasswares for hematology
8. Equipments for haematology.
9. Anticoagulant vials
10. Complete blood counts.

11. Determination of haemoglobin.
12. RBC count and TLC by hemocytometer.
13. Differential leukocyte count.
14. Determination of platelet count
15. Determination of ESR and PCV.
16. Erythrocyte Indices - MCV, MCH, MCHC.
17. Reticulocyte count
18. Absolute eosinophilic count
19. Morphology of blood cells
20. Urinalysis
21. Examination of cerebrospinal fluid
22. Examination of body fluids (pleural, pericardial, peritoneal)
23. Sputum examination.

TOTAL: 30 HOURS

BS3675	MICROBIOLOGY LABORATORY	L	T	P	C
		0	0	2	2

OBJECTIVE

To know about the microscope, methods of staining techniques, antibody reaction and microbial growth

Course Outcome – COs At the end of the course, the students will be able to		Cognitive Skill
CO-01	Develop basic skill in aseptic techniques and know the parts of the microscope and its principles	U
CO-02	Understand the different methods of staining techniques	A
CO-03	Understand nutritional requirements of bacteria and different cultivation techniques	U
CO-04	To determine the concepts of various antigen antibody reactions	A
CO-05	To determine the effect of antibiotics on microbial growth	E

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO \ CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	S	S	S	S	M	S	S	N	N	S	M	M	S
CO-02	S	S	S	S	S	L	N	N	N	S	M	N	N
CO-03	S	S	M	M	L	L	L	N	N	M	M	M	M
CO-04	S	S	M	M	L	N	N	N	N	M	N	N	S
CO-05	S	S	S	S	M	S	S	N	N	S	M	M	S

S- Strong, M- Medium, L-Low, N- Not Relevant

Practicals

- 1) Compound microscope and its application in microbiology.
- 2) Demonstration of sterilization equipments: hot air oven, autoclave, bacterial filters.
- 3) Preparation of commonly used culture media - Nutrient broth, nutrient agar, blood agar, MacConkey agar.
- 4) Determine serological test Widal.
- 5) Determine C Reactive protein.
- 6) Determine Antistreptolysin O in human serum.
- 7) Determine Rheumatoid arthritis.
- 8) Rapid test for HIV .
- 9) Rapid test for HBV.
- 10) Perform Simple staining.
- 11) Perform Grams staining.
- 12) Perform Acid fast staining.

TOTAL: 30 HOURS

BS3676	PHARMCOLOGY LABORATORY	L	T	P	C
		0	0	2	2

OBJECTIVE

To deals with the Concepts of General Pharmacology and Blood, basic technical terminology of Chemotherapy, Hormones.

Course Outcome – COs At the end of the course, the students will be able to,		Cognitive Skill
CO-01	Understand the rules of drug administration	U
CO-02	Know the dosages of various drugs	A
CO-03	Students will be able to understand fixed dose combinations	U
CO-04	Understand regarding the drug actions of various drugs	A
CO-05	Gain knowledge regarding different instruments and devices used for the administration of drugs	E

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO \ CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	L	S	M	S	S	M	S	S	L	S	S	M	S
CO-02	L	S	M	S	M	M	S	S	L	M	M	M	S
CO-03	L	S	M	S	M	S	S	S	M	S	S	L	S
CO-04	L	S	M	S	S	M	S	S	L	M	M	M	S
CO-05	L	S	M	S	M	M	S	S	L	S	S	M	S

S- Strong, M- Medium, L-Low, N- Not Relevant

Practicals

1. Dosage forms
2. Routes of Drug administration
3. Fixed dose combination - Amoxycillin + clavulanic acid, Cotrimoxazole, Lignocaine + Adrenaline
4. Drug stations
5. Instrument & devices (Nasogastric tube, laryngoscope, Different Catheters, nebulizers, Inhalers, Rotahalers, Insulin Syringe, Pen Insulin)
6. Adverse Drug Reactions

TOTAL: 30 HOURS**SEMESTER III**

S. No	Course Code	Course Title	L	T	P	C
THEORY						
1.	DT3601	Applied Pathology for Renal Dialysis Technology	3	1	0	4
2.	DT3602	Applied Microbiology for Renal Dialysis Technology	3	1	0	4
3.	DT3603	Introduction to Renal Dialysis Technology	3	1	0	4
4.	BS36S3	Introduction Biomedical Instrumentation	2	0	0	2
5.	BS36S4	Health care	3	0	0	3
CLICAL POSTINGS & PRACTICALS						
6.	DT3672	Applied Pathology Lab for Renal Dialysis Technology	0	0	2	2
7.	DT3673	Applied Microbiology Lab for Renal Dialysis Technology	0	0	2	2
8.	DT3671	Introduction to Renal Dialysis Technology Laboratory	0	0	2	2
Total			14	3	6	23

DT3601	APPLIED PATHOLOGY FOR RENAL DIALYSIS TECHNOLOGY	L	T	P	C
		3	1	0	4

OBJECTIVE

This subject deals with various disease conditions that affects the human body

Course Outcome – COs		Cognitive Skill
At the end of the course, Students will be able to		
CO-01	Understand various congenital disorders of renal system.	U,A,E
CO-02	Know the various pathological changes and signs and symptoms of glomerular diseases	R,A,E
CO-03	Get the adequate knowledge regarding the various types of glomerular disorders.	U,A,E

CO-04	Get a clear picture regarding the pathological changes, signs and symptoms and management of renal disorders.	R,A
CO-05	Know the basic knowledge regarding dialysis and disease condition related to urinary system	U,A,E

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO- A	PO- B	PO- C	PO- D	PO- E	PO- F	PO- G	PO- H	PO- I	PO- J	PO- k	PO- -L	PO- M
CO-01	M	L	L	S	M	M	L	L	N	L	M	L	M
CO-02	M	L	M	S	L	M	M	L	L	M	L	N	L
CO-03	L	L	M	S	M	M	M	L	L	M	L	L	M
CO-04	M	L	M	S	M	L	M	L	M	M	L	L	L
CO-05	M	M	L	S	M	M	M	L	M	L	M	M	L

S- Strong, M- Medium, L-Low, N- Not Relevant

Unit I:

12

Congenital and cystic diseases of kidney, Introduction and clinical manifestations of glomerular diseases, Pathogenesis of glomerular diseases -Brief

Unit II:

12

Nephritic syndrome - Acute post infectious glomerulonephritis, Rapidly progressive glomerulonephritis Nephrotic syndrome - Membranous glomerulonephritis, Minimal change disease, Focal segmental glomerulosclerosis, Membranoproliferative glomerulonephritis

Unit III:

12

IgA nephropathy and chronic glomerulonephritis Glomerular lesions in systemic diseases - diabetes, amyloidosis, systemic lupus erythematosus Vascular diseases - benign hypertension, malignant hypertension, renal artery stenosis, thrombotic microangiopathy

Unit IV:

12

Tubulo-interstitial diseases:Acute tubular injury, Pyelonephritis - acute and chronic Tubulointerstitial nephritis due to drugs and toxins, others mention briefly Obstructive uropathy

Unit V:

12

Urolithiasis and lower urinary tract infections Pathology of peritoneum, peritonitis, bacterial, tubular & sclerosing peritonitis, dialysis induced changes

TOTAL: 60 HOURS

TEXT BOOKS

- 1 Basic Pathology Robbins Saunders an imprint of Elsevier Inc., Philadelphia, USA
- 2 Text book of Pathology Harsh Mohan Jaypee Brothers, New Delhi
- 3 Practical Pathology P. Chakraborty, GargiChakraborty New Central Book Agency, Kolkata
- 4 Text Book of Haematology Dr.Tejinder Singh Arya Publications, Sirmour (H.P)
- 5 Text Book of Medical Laboratory Technology PrafulGodkar, Bhalani Publication House, Mumbai.

DT3602	APPLIED MICROBIOLOGY FOR RENAL DIALYSIS TECHNOLOGY	L	T	P	C
		3	1	0	4

OBJECTIVE

Students will learn the basic concepts in Clinical Microbiology

Course Outcome – COs At the end of the courses, The student will able to		Cognitive Skill
CO-01	Deep knowledge in sterilization and disinfection	U, R
CO-02	Acquire knowledge about the concept of infection and its control.	U
CO-03	Knowledge in health care associated infection	R
CO-04	About chemotherapy and drug resistance.	An, R
CO-05	Knowledge in Urinary tract infections and its diagnosis, treatment and prevention.	U, R

R- Remember, U – Understand, A – Apply, An – Analyze, E – Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO -A	PO -B	PO- C	PO -D	PO- E	PO- F	PO -G	PO -H	PO - I	PO - J	PO- k	PO - L	PO- M
CO-01	S	S	S	L	L	M	M	N	N	M	S	S	S
CO-02	S	S	S	L	M	N	M	N	L	S	S	M	S
CO-03	S	S	S	M	M	M	M	N	N	M	S	M	S
CO-04	S	S	S	S	M	M	S	N	L	S	M	M	S
CO-05	S	S	S	M	L	L	M	N	N	S	S	M	S

S- Strong, M- Medium, L-Low, N- Not Relevant

Unit I: Sterilization and Disinfection

12

Sterilization and disinfection - classification, principle, methods - Disinfection of instruments used in patient care, Patient care unit -Central sterile supply department - Biomedical waste management.

Unit II: Infection and Infection Control

12

Infection, Sources, transmission, portal of entry and exit, Standard (Universal) safety Precautions & hand hygiene, Infection control measures for Hospitals - Biosafety & Biohazard.

Unit III: Health care associated infections**12**

Sources, causes and factors of Health care associated Infections - Surgical site infections - Urinary tract infections - Ventilator associated pneumonia- Catheter associated blood stream infections - Antibiotic associated diarrhea

Unit IV: Chemotherapy and Drug resistance**12**

Chemotherapeutic agents –classification – Mechanism of Action, Chemotherapy – Routes and Methods of Chemotherapy administration -Drug Resistance and its Mechanism – Resistance minimization.

Unit V: Urinary tract Infections**12**

UTI – PKD, Urethritis, Cystitis, Pyelonephritis, vaginitis. Collection, handling, transport and processing of various clinical samples, Diagnosis, treatment and prevention of Urinary tract infections.

TOTAL:60 HOURS**REFERENCE BOOKS**

1. Textbook of Microbiology by Ananthnarayan and Paniker.
2. Textbook of Hospital Infection Control by Purvamathur.
3. Textbook of Microbiology by Baveja.
4. Hospital Infection Control by Mayhall.

DT3603	INTRODUCTION TO RENAL DIALYSIS TECHNOLOGY	L	T	P	C
		3	1	0	4

OBJECTIVE

This subject deals with kidney diseases and basics of dialysis.

Course Outcome – COs At the end of the course,the students will able to,		Cognitive Skill
CO-01	Understand the epidemiology and magnitude of kidney disease.	U
CO-02	Remember the anatomy of kidney, neck, upper and lower limb vessels.	R
CO-03	Understand the history collection and clinical presentation of renal patients.	U
CO-04	Evaluate the Investigations in Nephrology	E
CO-05	Analyze the Screening for chronic kidney disease and preventive nephrology	An

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	S	S	S	S	L	M	S	M	L	S	M	S	S
CO-02	S	S	S	S	S	S	S	M	S	S	M	S	S

CO-03	S	S	S	N	S	S	S	M	S	S	S	M	S
CO-04	S	S	S	N	S	S	S	M	S	S	S	L	S
CO-05	S	S	S	S	S	S	S	M	S	S	S	L	S

S- Strong, M- Medium, L-Low, N- Not Relevant

Unit I: **12**
Epidemiology of kidney disease/ magnitude of the problem in community/ Demographics of ESRD population/ global epidemiology of RRT options

Unit II: **12**
Applied renal anatomy and physiology, applied anatomy of neck, upper limb & lower limb vessels.

Unit III: **12**
Clinical presentation of renal disease & history taking.

Unit IV: **12**
Investigations in Nephrology- Urine examination, hemogram, serology, biochemical tests, radioimaging in nephrology, renal biopsy (indications, prerequisites, complications), Investigations required before starting of dialysis.

Unit V: **12**
Screening for chronic kidney disease and preventive nephrology.

TOTAL: 60 HOURS

TEXT BOOKS

1. Dialysis therapy- Nissenson & Fine
2. Handbook of dialysis- Daugirdas, Blake & Todd
3. Principles and practice of dialysis- Heinrich
4. Primer to kidney disease
5. CKD, Dialysis and transplant- A companion to Brenner & Rectors- The Kidney
6. Comprehensive Clinical nephrology -John Feehally
7. Handbook of nutrition and kidney- Lippincott Williams & Wilkins

BS36S3	INTRODUCTION TO BIOMEDICAL INSTRUMENTATION	L	T	P	C
		2	0	0	2

OBJECTIVE

This subject deals with basic biomedical equipments and their operation techniques.

Course Outcome – COs At the end of the course, the students will be able to,		Cognitive Skill
CO-01	Familiar with the basic concepts of Biomedical Instrumentation	R,U
CO-02	Understand the various types of bioelectric signals and the electrodes used to record these signals	U,An,A
CO-03	Understand the principle and the applications of modern imaging systems	R,U,A

CO-04	Understand the working and applications of various therapeutic equipments	R,U,A
CO-05	Familiar with the recent advancements in the field of biomedical engineering	R,U,An

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO- A	PO- B	PO- C	PO- D	PO- E	PO- F	PO- G	PO- H	PO - I	PO- J	PO- k	PO - L	PO-M
CO-01	S	S	M	L	L	M	M	M	M	M	L	L	M
CO-02	S	S	M	L	L	M	M	M	M	M	L	L	M
CO-03	S	S	S	M	M	M	M	M	M	M	N	L	L
CO-04	S	S	S	S	S	S	S	M	M	L	N	L	M
CO-05	S	S	M	M	M	M	M	S	S	L	L	L	M

S- Strong, M- Medium, L-Low, N- Not Relevant

Unit I: Fundamentals of Medical Instrumentation

6

What is Biomedical Engineering? Anatomy and Physiological systems of the body, Sources of biomedical signals, Basic Medical Instrumentation System, Performance Requirement of Medical Instrumentation System, Intelligent Medical Instrumentation System, General Constraints in design of Medical Instrumentation System, Types of Biomedical Instrumentation Systems.

Unit II: Bioelectric Signals and Electrodes

6

Origin of Bioelectric Signals, Bioelectric Signals – Electrocardiogram (ECG), Electroencephalogram (EEG), Electromyogram (EMG), Electroretinogram (ERG), Electrooculogram (EOG). Purpose of Electrode paste, Electrodes for ECG, EEG and EMG.

Unit III: Modern Imaging Systems

6

Basic concepts and fundamentals of – X-ray machines, Computed Tomography, Nuclear Medical Imaging system, Magnetic Resonance Imaging system, ultrasonic Imaging system, Thermal Imaging system.

Unit IV: Modern Imaging Systems

6

Basic concepts and fundamentals of – Cardiac Pacemaker, Cardiac Defibrillators, Physiotherapy and Electrotherapy Equipment, Haemodialysis Machines, Lithotriptors, Anaesthesia Machine, Ventilators, Radiotherapy Equipment, Automated Drug delivery systems.

Unit V: Recent Trends in Biomedical

6

Basic concepts and Applications in Biomedical- LASER, BIOMEMS and Nano Technology, Biomaterials and Implants, Artificial Organs, Rehabilitation Engineering.

TOTAL: 30 HOURS

TEXT BOOKS

1. Leslie Cromwell, “Biomedical Instrumentation and measurement”, Prentice hall of India, New Delhi, 1997.
2. Khandpur R.S, “Handbook of Biomedical Instrumentation”, Tata McGraw-Hill, New Delhi, 1997.

REFERENCE BOOKS

1. John G. Webster, "Medical Instrumentation Application and Design", John Wiley and sons, New York, 1998.
2. Joseph J.carr and John M. Brown, "Introduction to Biomedical equipment technology", John Wiley and sons, New York, 1997.

BS36S4	HEALTH CARE	L	T	P	C
		3	0	0	3

OBJECTIVE

This subject deals with the health care and its basics.

Course Outcome – COs At the end of the course,the students will able to,		Cognitive Skill
CO-01	Get a clear picture about the concepts of health and dimensions of health	U & A
CO-02	Develop a knowledge about the evolution of health care delivery systems and the levels of health care	U & A
CO-03	Learns the Primary health care, Secondary and tertiary health care delivery of services	U & A
CO-04	Study about the Primary health care - Current status in India and National Health Programmes	U
CO-05	Learn about the National Health Programmes and first aid	U & A

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	L	M	M	M	L	S	S	S	M	S	S	L	S
CO-02	L	M	M	M	M	M	S	S	S	M	M	L	S
CO-03	L	M	M	L	L	S	S	M	S	M	M	L	S
CO-04	L	M	M	M	L	S	M	S	S	M	M	L	S
CO-05	L	M	M	M	M	S	S	S	M	S	S	M	S

S- Strong, M- Medium, L-Low, N- Not Relevant

Unit I:

9

Concepts of Health

Definition of health; evolution in concepts of public health; public health events-sanitary awakening, germ theory of disease, rise of public health in various countries, changing concepts of health-biomedical concept, ecological concept, psycho-social concept and holistic concept.

Dimensions of Health

Physical dimension, mental dimension, Social dimension etc; Common health problems in India - Communicable diseases, Non communicable diseases, MCH problems, Nutritional problems, Environmental sanitation, Glance over National Health profile.

Unit II: 9

Evolution of health care delivery systems

History of health care delivery services; Genesis of primary health care; National health policy; MDGs.

Levels of health care

Primary health care, secondary health care, tertiary health care. Primary health care-principles of primary health care, elements of primary health care.

Unit III: 9

Primary health care: Delivery of services

Introduction; Structure of health care delivery system; Delivery of primary health care services at village level; Village health guide, ASHA, ICDS: Subcentre: Primary health centre.

Secondary and tertiary health care: Delivery of services

Community Health centre; First referral unit; District hospital.

Unit IV: 9

Primary health care - Current status in India

Status of health care infrastructure; Health team concept; Health insurance; Social security and social assistance in health; AYUSH.

National Health Programmes

Introduction; National Vector Borne Disease Control Programme; National Leprosy Eradication Programme; Revised National Tuberculosis Control Programme; National AIDS Control Programme; Universal Immunization Programme; National Rural Health Mission.

Unit V: 9

National Health Programmes

Reproductive and Child Health Programme; Integrated Management of Neonatal and Childhood Illnesses; National Nutritional Anemia Prophylaxis Programme; National Programme for Control of Blindness; National Cancer Control Programme; National Mental Health Programme.

First aid

Basic terminologies; general guidelines; first aid in specific situations; Wound, bleeding, fracture, choking, burns, epistaxis, strains and sprain, animal bites (classification, causes and first aid), Cardio-pulmonary resuscitation

TOTAL: 45 HOURS

TEXT BOOKS

1. Park K. Park's Textbook of Preventive and Social Medicine. 23rd ed. Jabalpur: BanarsidasBhanot Publishers, 2015. p.135-141
2. Suryakantha. Textbook of Community Medicine with recent advances. 4th edition
3. Bhalwar R editor. Textbook of Public Health and Community Medicine. 2nd Pune, Department of Community medicine AFMC; 2012
4. Essentials of Community Medicine for Allied Health Sciences, JSS University Publications, 2015

DT3672	APPLIED PATHOLOGY LAB FOR RENAL DIALYSIS TECHNOLOGY	L	T	P	C
		0	0	2	2

OBJECTIVE

This subject deals with the examinations, blood tests, and basic lab investigations.

Course Outcome – COs At the end of the course, the students will be able to,		Cognitive Skill
CO-01	Understand Urine examination: physical, chemical, microscopy.	U,A,E
CO-02	Know about Blood grouping & Rh typing	R,A,E
CO-03	Get the adequate knowledge Hemoglobin estimation, packed cell volume (PCV), erythrocyte sedimentation rate (ESR)	U,A,E
CO-04	Get a clear picture regarding the Histopathology: fixatives and preservation of tissues, processing, hematoxylin and eosin staining.	R,A
CO-05	Know the basic knowledge regarding the procedure hemodialysis	U,A,E

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	M	L	L	S	M	M	L	L	N	L	M	L	M
CO-02	M	L	M	S	L	M	M	L	L	M	L	N	L
CO-03	L	L	M	S	M	M	M	L	L	M	L	L	M
CO-04	M	L	M	S	M	L	M	L	M	M	L	L	L
CO-05	M	M	L	S	M	M	M	L	M	L	M	M	L

S- Strong, M- Medium, L-Low, N- Not Relevant

Practicals

1. Urine examination: physical, chemical, microscopy.
2. Blood grouping and Rh typing.
3. Hemoglobin estimation.
4. Packed cell volume (PCV).
5. Estimation of ESR.
6. ABG Analysis
7. KUB Analysis.
8. Histopathology- Fixatives and Preservatives of tissues.

TOTAL :30HOURS

DT3673	APPLIED MICROBIOLOGY LAB FOR RENAL DIALYSIS TECHNOLOGY	L	T	P	C
		0	0	2	2

OBJECTIVE

This subject deals with the sterilization method and microbiological tests Course.

Outcome – COs At the end of the course,the students will able to,		Cognitive Skill
CO-01	Sterilization and disinfection practices in tertiary care hospital	R
CO-02	Quality control of sterilization and Interpretation of results of sterility testing	U
CO-03	Know about the Collection of specimen patient, OT and OT sterility testing.	An
CO-04	Preparation of materials for autoclaving.	A
CO-05	Disinfection of wards, operation theatres and laboratory and air sampling methods.	E

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	M	S	L	N	N	N	N	L	L	M	M	L	M
CO-02	M	M	S	N	N	N	N	M	M	S	S	S	M
CO-03	S	S	S	N	N	N	N	M	M	S	S	S	S
CO-04	M	S	S	N	S	S	S	M	L	S	S	M	M
CO-05	M	M	L	N	N	M	M	L	M	M	S	N	M

S- Strong, M- Medium, L-Low, N- Not Relevant

Practicals

1. Sterilization of patient care unit, OT, ICU.
2. Sterilization of equipment in hospitals.
3. Sterility testing by open plate method.
4. Sterility testing by swabbing.
5. Antibiotic sensitivity test.
6. Collection of clinical samples.
7. Transportation of clinical samples.
8. Isolation pathogen from urine sample
9. Isolation of pathogens from sputum sample.
10. Isolation of pathogens from blood sample.
11. Isolation of pathogens from throat swab.

TOTAL :30HOURS

DT3671	INTRODUCTION TO RENAL DIALYSIS TECHNOLOGY	L	T	P	C
		0	0	2	2

OBJECTIVE

To know about the history collection and case presentation,diagnostic and screening tests of renal patients.

Course Outcome – COs At the end of the course,the students will able to,		Cognitive Skill
CO-01	Understand the blood and urine investigations for renal patients	U
CO-02	Explain the anatomy of kidney, neck, upper and lower limb vessels.	R
CO-03	Understand the history collection and case presentation of renal patients.	U
CO-04	Evaluate the diagnostic tests in Nephrology	E
CO-05	To determine the Screening tests of chronic kidney disease	An

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	S	S	S	S	L	M	S	M	L	S	M	S	S
CO-02	S	S	S	S	S	S	S	M	S	S	M	S	S
CO-03	S	S	S	N	S	S	S	M	S	S	S	M	S
CO-04	S	S	S	N	S	S	S	M	S	S	S	L	S
CO-05	S	S	S	S	S	S	S	M	S	S	S	L	S

S- Strong, M- Medium, L-Low, N- Not Relevant

Practicals

- 1.History taking
- 2.Clinical Examination:General Physical Examination and assessment of vital signs
- 3.Clinical Examination:Basic Systemic Examination
- 4.Conversion between different units
- 5.Identifying the types of medical gas supply and its advantages/disadvantages
- 6.Devices:Sphygmomanometer,thermometer,pulse oximeter,simple oxygen delivery devices

TOTAL:30 HOURS

SEMESTER IV

Sl. No	Course Code	Course Title	L	T	P	C
THEORY						
1.	BS36S5	Patient care and Basic Nursing	3	1	0	4
2.	DT3604	Basic Concepts of Renal disease	3	1	0	4
3.	DT3605	Acute & Chronic kidney diseases & Nutrition	3	1	0	4
4.	BS36S6	Biostatistics and Research Methodology	2	0	0	2
5.	BS36S7	Constitution of India	3	0	0	3
CLICAL POSTINGS & PRACTICALS						
6.	BS3679	Patient care and Basic Nursing Laboratory	0	0	2	2
7.	DT3674	Basic concepts of Renal disease Laboratory	0	0	2	2

8.	DT3675	Acute & Chronic Kidney Diseases & Nutrition Technology Laboratory	0	0	2	2
Total			14	3	6	23

BS36S5	PATIENT CARE AND NURSING	L	T	P	C
		3	1	0	4

OBJECTIVE

To learn about patient care and basics of nursing activities, communication and documentation, infection control, medication administration and wound care.

Course Outcome – COs At the end of the course, the students will be able to,		Cognitive Skill
CO-01	Use intra and inter professional communication and collaboration to promote care coordination for safe quality patient care	U,A,E
CO-02	Apply levels of prevention to promote well being and prevent disease in complex situation for individuals of group	R,A,E
CO-03	Provide safe administration of medication and transport of patient safely.	R,A
CO-04	Practice caring, competent, holistic, high quality, patient centered nursing in complex situation	U,An,E
CO-05	Do wound care, first care and basic life support to the patient in any emergency situation.	R,A,E

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO \ CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	N	M	S	L	N	S	S	M	S	L	L	N	M
CO-02	N	L	S	M	L	L	M	N	M	S	L	M	L
CO-03	L	M	S	M	L	L	M	N	L	M	L	L	S
CO-04	L	M	S	S	M	L	M	L	L	M	L	L	M
CO-05	L	M	S	M	M	L	L	L	M	M	L	L	M

Unit I:

12

Introduction, Communication and Documentation, Introduction to Patient Care: Principles of patient care, Types of patients (gender, age, diseases, severity of illness, triage) Communication & Documentation: Communication with doctors, colleagues and other staffs. Non-verbal communication, Inter-personnel relationships. patient contact techniques, communication with patients and their relatives, Documentation: Importance of documentation, initial and follow up notes; documentation of therapy, procedures and communication.

Unit II:

12

Universal Precautions and Infection Control: Hand washing and hygiene. Injuries and Personal protection, Insulation and safety procedures. Aseptic techniques, sterilization and disinfection. Disinfection and Sterilization of devices and equipment Central sterilization and supply department, Biomedical Medical waste management

Unit III:**12**

Medication Administration Oral / Parenteral route, Parenteral medication administration: Intra venous, intra muscular, sub-cutaneous, intra dermal routes, Intra venous Infusion Aerosol medication, administration, Oxygen therapy, Intravenous fluids, Blood and blood component transfusion Position and Transport of patient: Patient position, prone, lateral, dorsal, dorsal recumbent, Fowler's positions, comfort measures, bed making, rest and sleep. Lifting and transporting patients: lifting patients up in the bed, transferring from bed to wheel chair, transferring from bed to stretcher. Transport of ill patients (inotropes, intubated / ventilated patients)

Unit IV:**12**

Bedside care and monitoring: Bedside care: Methods of giving nourishment: feeding, tube feeding, drips, transfusion. Recording of pulse, blood pressure, respiration, saturation and temperature. Bed side management: giving and taking bed pan, urine container. Observation of stools, urine, sputum, drains, Use and care of catheters and rubber goods. Care of immobile/bed ridden patients, bed sore and aspiration prevention Monitoring of Patient: Pulse, ECG (Cardiac Monitor), Oxygen Saturation, Blood Pressure, Respiration, Multi parameter monitors, Capnography and End Tidal CO₂ (ETCO₂), Hydration, intake and output monitoring, Monitoring ventilator parameters: Respiratory Rate, Volumes, Pressures, Compliance, Resistance

Unit V:**12**

Wound care and first aid: Dressing and wound care: Bandaging: basic turns, bandaging extremities, triangular bandages and their application. Surgical dressing: observation of dressing procedures. Suture materials and suturing techniques Splinting, Basic care of patient with burns, First Aid and Basic Life Support (BLS)

REFERENCE BOOKS

1. Principles and Practice of Nursing - Sr Nancy
2. Introduction to Critical Care Nursing - Mary Lou Sole
3. First Aid - Redcross Society Guidelines
4. Basic Life Support (BLS) - American Heart Association Guidelines

TOTAL: 60 HOURS

DT3604	BASIC CONCEPTS OF RENAL DISEASE	L	T	P	C
		3	1	0	4

OBJECTIVE

In this subject students will learn about different kinds of renal disorders and conditions.

Course Outcome – COs At the end of the course, the students will be able to,		Cognitive Skill
CO-01	Types, causes, complications and management of electrolyte imbalance.	R
CO-02	Know about the etiology and management of UTI.	U
CO-03	Know about the composition, types and management of urolithiasis.	U
CO-04	Know about the hypertension.	R,A
CO-05	Know about concepts of nephrotic syndrome and its different causes.	U,E

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO- A	PO- B	PO- C	PO-D	PO- E	PO- F	PO- G	PO- H	PO - I	PO- J	PO- k	PO - L	PO- M
CO-01	S	N	M	M	S	N	M	M	M	S	L	L	M
CO-02	M	M	M	L	S	N	M	M	M	S	M	N	M
CO-03	S	M	S	M	M	N	M	M	N	S	N	M	N
CO-04	M	N	M	L	S	N	M	M	M	S	N	L	M
CO-05	N	M	M	M	M	N	M	N	S	M	L	M	M

S- Strong, M- Medium, L-Low, N- Not Relevant

Unit I:

12

Fluid and electrolyte disorders- Hyponatremia, hypernatremia, hypokalemia & hyperkalemia: Etiology, clinical presentation and management Disorders of calcium, phosphorous & magnesium ions. Acid- base disorders : Basics of ABG Metabolic acidosis & metabolic alkalosis: pathophysiology, etiology , clinical features and management.

Unit II:

12

Urinary tract infections: Definition, types of UTI, risk factors, diagnosis, treatment

Unit III:

12

Renal stone diseases, inherited and cystic renal diseases Composition of kidney stones, risk factors for recurrent stones, clinical presentation, prevention of recurrent stones & treatment

Unit IV

12

Hypertension- normal BP control, definition, evaluation, primary & secondary HTN, complications, antihypertensive drugs

Unit V:

12

Nephrotic syndromes- definition, clinical features, causes(MCNS, FSGS, MGN...), Primary & secondary NS, complications, management Acute glomerulonephritis/RPGN- definition, causes(PSGN,vasculitis, anti GBM, SLE, HSP....), clinical features, management.

TOTAL: 60 HOURS

TEXT BOOKS

1. Dialysis therapy- Nissenson& Fine
2. Handbook of dialysis- Daugirdas ,Blake & Todd
3. Principles and practice of dialysis- Heinrich
4. Primer to kidney disease
5. CKD, Dialysis and transplant- A companion to Brenner & Rectors- The Kidney
6. Comprehensive Clinical nephrology -John Feehally
7. Handbook of nutrition and kidney- Lippincott Williams & Wilkins

DT3605	ACUTE AND CHRONIC KIDNEY DISEASES AND NUTRITION	L	T	P	C
		3	1	0	4

OBJECTIVE

To deals with the concepts of Renal Diseases and its Management.

Course Outcome – COs At the end of the course, the students will be able to,		Cognitive Skill
CO-01	Know about acute kidney injury and its management	R
CO-02	Acquire knowledge of chronic kidney diseases, disease management and RRT options	U
CO-03	Understand the nutritional requirements for healthy adult and renal failure patients	U
CO-04	Understand for planning balanced diet for renal patients	A
CO-05	Evaluate nutritional requirement in dialysis patients	E

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	S	S	S	S	M	M	L	S	S	S	M	S	S
CO-02	M	S	S	S	S	S	S	S	M	S	M	S	S
CO-03	S	S	M	N	N	S	S	S	S	M	L	N	S
CO-04	S	S	M	N	N	S	S	S	S	M	L	N	S
CO-05	M	S	S	S	L	S	S	S	S	M	S	L	S

S- Strong, M- Medium, L-Low, N- Not Relevant

Unit I:

12

AKI- definition, classification, etiology, strategies of reducing risk for AKI, complications, Non dialysis management of AKI dialysis therapy for AKI , Dialysis in ICU setting

Unit II:

12

Chronic kidney diseases- definition, staging , GFR calculation, causes for CKD, steps to retard progression of CKD, complications of CKD(cardiovascular, hematologic, mineral bone disorders, dermatologic, neuropsychiatric...), evaluation of CKD, management and RRT options

Unit III:

12

Nutritional requirements of healthy adults, RDA, effects of renal failure on nutrient metabolism, lipid abnormalities, overview of calcium phosphorous metabolism, trace elements and vitamins

Unit IV:

12

Sources and types of proteins, fats, carbohydrates and planning balanced diet

Unit V:

12

Diet in nephrotic syndrome, AKI, predialysis CKD, Nutrition in dialysis patients, foods to be avoided in CKD, fluid restriction.

TOTAL: 60 HOURS

TEXT BOOKS

1. Dialysis therapy- Nissenson & Fine
2. Handbook of dialysis- Daugirdas, Blake & Todd
3. Principles and practice of dialysis- Heinrich
4. Primer to kidney disease
5. CKD, Dialysis and transplant- A companion to Brenner & Rectors- The Kidney
6. Comprehensive Clinical nephrology -John Feehally
7. Handbook of nutrition and kidney- Lippincott Williams & Wilkins

BS36S6	BIostatISTICS AND RESEARCH METHODOLOGY	L	T	P	C
		2	0	0	2

OBJECTIVE

To have a basic knowledge of biostatistics and its applications in medicine.

Course Outcome – COs At the end of the course, the students will be able to,		Cognitive Skill
CO-01	Deals with basic knowledge of biostatistics and its application in medicine	U
CO-02	Deals with various types of data presentation and data summarization	R
CO-03	Deals with data analysis and sampling technique	An
CO-04	Deals with various study designs	E
CO-05	Deals with application of various study designs in medical research	A

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO \ CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	S	S	M	M	L	L	M	S	S	M	S	N	M
CO-02	L	S	L	M	L	M	S	S	M	M	S	L	S
CO-03	M	S	M	M	L	M	S	S	S	L	S	L	S
CO-04	M	S	M	L	M	M	M	S	S	M	S	N	M
CO-05	S	S	L	L	M	L	S	S	M	M	S	L	S

S- Strong, M- Medium, L-Low, N- Not Relevant

Unit I: Introduction and Presentation of data

6

Meaning, Branches of Statistics, Uses of statistics in medicine, Basic concepts, Scales of measurement, Collection of data, Presentation of data; Tabulation, Frequency Distribution, Diagrammatic and Graphical Representation of Data.

Measures of central tendency and Measures of Variation

Arithmetic Mean (Mean), Median, Mode, Partition values, Range, Interquartile range, Mean Deviation, Standard Deviation, Coefficient of Variation.

Unit II: Probability and standard distributions**6**

Definition of some terms commonly encountered in probability, Probability distributions; Binomial distribution, Poisson distribution, Normal distribution, Divergence from normality; Skewness and kurtosis

Census and Sampling Methods

Census and sample survey, Common terms used in sampling theory, Non-probability (Non random) Sampling Methods; Convenience sampling, Consecutive Sampling, Quota sampling, Snowball sampling, Judgmental sampling or Purposive sampling, Volunteer sampling, Probability (Random) Sampling methods; Simple random sampling, Systematic Sampling, Stratified Sampling, Cluster sampling, Multi-stage sampling, Sampling error, Non-sampling error.

Unit III: Inferential statistics**6**

Parameter and statistic, Estimation of parameters; Point estimation, Interval Estimation, Testing of hypothesis; Null and alternative hypotheses, Type-I and Type-II Errors

Unit IV: Introduction to research methodology**6**

Types of research; Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs Qualitative, Conceptual vs. Empirical.

Study Designs-Observational Studies

Epidemiological study designs; Observational studies, Descriptive studies; Case reports, Case series, Analytical studies; Case control studies, Cohort studies, Cross sectional

Unit V: Experimental Studies**6**

Experimental studies (Interventional studies); Randomized control Trials (Clinical trials), Field trials, Community trials, Non-Randomized Trials Uses of Epidemiology, Application of study Designs in Medical Research

TOTAL :30 HOURS**REFERENCE BOOKS**

1. K.R.Sundaram, S.N.Dwivedi and V Sreenivas (2010), Medical statistics, Principles and Methods, BI Publications Pvt Ltd, New Delhi
2. NSN Rao and NS Murthy (2008), Applied Statistics in Health Sciences, Second Edition, Jaypee Brothers Medical Publishers (P) Ltd.
3. J.V.Dixit and L.B.Suryavanshi (1996), Principles and Practice of Biostatistics, First Edition, M/S BanarsidasBhanot Publishers.
4. GetuDegu and FasilTessema (2005), Biostatistics, Ethiopia Public Health Training Initiative.
5. Essentials of Community Medicine for Allied Health Sciences, JSS University Publications, 20.

BS36S7	CONSTITUTION OF INDIA	L	T	P	C
		3	0	0	3

OBJECTIVE

To have a basic knowledge of Indian constitution

Course Outcome – COs At the end of the course, the students will be able to,		Cognitive Skill
CO-01	Understand the emergence and evolution of Indian Constitution.	U
CO-02	Understand the autonomous nature of <i>constitutional</i> bodies like Supreme Court and high court, controller and auditor general of <i>India</i> and election.	R
CO-03	Understand and analyse the three organs of the state in the contemporary scenario.	An
CO-04	Understand and analyse federalism in the Indian context.	E
CO-05	Understand and Evaluate the Indian Political scenario amidst the emerging challenges.	A

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	M	S	M	M	M	M	M	M	M	M	M	M	M
CO-02	S	S	M	L	L	M	M	S	S	L	M	M	M
CO-03	S	S	M	M	M	M	M	M	M	M	M	M	M
CO-04	M	M	S	M	M	S	S	L	M	M	M	M	M
CO-05	M	M	M	M	M	M	M	M	M	M	S	L	M

S- Strong, M- Medium, L-Low, N- Not Relevant

Unit I:

9

Meaning of the term 'Constitution', Making of the Indian Constitution 1946-1950, The democratic institutions created by the constitution, Bicameral system of Legislature at the Centre and in the States.

Unit II:

9

Fundamental rights and duties their content and significance, Directive principles of States, policies the need to balance fundamental rights with directive principles Special rights created in the Constitution for dalits, backwards, women and children and the religious and linguistic minorities.

Unit III:

9

Doctrine of Separation of Powers, legislative, executive and judicial and their functioning in India, The Election Commission and State Public Service commissions.

Unit IV:

9

Method of amending the Constitution, Enforcing rights through writs

Unit V:

9

Constitution and sustainable development in India.

TOTAL:45 HOURS

BS3679	PATIENT CARE AND BASIC NURSING LABORATORY	L	T	P	C
		0	0	2	2

OBJECTIVE

Students will be able to understand the of Patient care Procedures such as Positioning of patient, transport of the patient

Course Outcome – COs		Cognitive Skill
At the end of the course, Student will be able to		
CO-01	Understand the of Patient care Procedures such as Positioning of patient, transport of the patient, Dressing and Bandaging, Care of inter costal drain tube, Insertion of naso-gastric tube and feeding	U,A,E
CO-02	Know administration of Oxygen, Suctioning and care of artificial airway, Insertion of urinary bladder catheter	R,A,E
CO-03	Able to know the administration of Injections: intra muscular, intra venous, sub cutaneous, intra dermal	R,A
CO-04	Able to understand the uses, principles, advantages and disadvantages of instruments and Devices in patient care	U,An,E
CO-05	Able to do wound care, first care and basic life support to the patient in any emergency situation.	R,A,E

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	N	M	S	L	N	S	S	M	S	L	L	N	M
CO-02	N	L	S	M	L	L	M	N	M	S	L	M	L
CO-03	L	M	S	M	L	L	M	N	L	M	L	L	S
CO-04	L	M	S	S	M	L	M	L	L	M	L	L	M
CO-05	L	M	S	M	M	L	L	L	M	M	L	L	M

Practicals

1. Demonstration of patient care procedures
2. Positioning of patient, transport of the patient, Dressing and bandaging, Care of intercostal drain tube, Insertion of naso-gastric tube and feeding
3. Phlebotomy and obtaining blood samples, Arterial blood sampling of ABG
4. Injections: intra muscular, intra venous, subcutaneous, intra dermal
5. Insertion of intravenous catheter and infusion of medications, blood transfusion
6. Recording of ECG and monitoring of patient
7. Oxygen therapy: Oxygen cannula, masks, Aerosol therapy: nebulization, inhalers
8. Suctioning and care of artificial airway
9. Insertion of urinary bladder catheter
10. Uses, principles, advantages, disadvantages of instruments and devices in patient care
11. First aid and Basic life support (BLS)

TOTAL: 30HOURS

DT3674	BASIC CONCEPTS OF RENAL DISEASE LABORATORY	L	T	P	C
		0	0	2	2

OBJECTIVE

The students will know about the composition, types and management of different diseases

Course Outcome – COs At the end of the course, the students will be able to,		Cognitive Skill
CO-01	Deals with the types, causes, complications and management of electrolyte imbalance.	R
CO-02	Know about the etiology and management of UTI.	U
CO-03	Know about the composition, types and management of urolithiasis.	U
CO-04	Deals with the hypertension.	R,A
CO-05	Know about concepts of nephrotic syndrome and its different causes.	U,E

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	S	N	M	M	S	N	M	M	M	S	L	L	M
CO-02	M	M	M	L	S	N	M	M	M	S	M	N	M
CO-03	S	M	S	M	M	N	M	M	N	S	N	M	N
CO-04	M	N	M	L	S	N	M	M	M	S	N	L	M
CO-05	N	M	M	M	M	N	M	N	S	M	L	M	M

S- Strong, M- Medium, L-Low, N- Not Relevant

Practicals

1. Cardio Pulmonary Resuscitation
2. Endotracheal Intubation
3. Priming of dialysis apparatus
4. Demonstration of dialysis Reuse
5. Renal function test
6. TPR
7. ABG
8. Urinalysis
9. Monitoring blood pressure
10. Oxygen Saturation

TOTAL: 30HOURS

DT3675	ACUTE AND CHRONIC KIDNEY DISEASES AND NUTRITION LABORATORY	L	T	P	C
		0	0	2	2

OBJECTIVE

Students will be able to know about dialysis procedures and methods.

Course Outcome – COs At the end of the course, students may be able to		Cognitive Skill
CO-01	Know about the procedure priming of dialysis apparatus.	R
CO-02	Acquire knowledge regarding dialyzer reuse.	U
CO-03	Understand the nutritional requirements renal failure patients.	U
CO-04	Understand HD catheters, dialysers, AV needle, tubings, dialysis machine. chemicals used in hemodialysis.	A
CO-05	Understand chemicals used in hemodialysis.	E

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	S	S	S	S	M	M	L	S	S	S	M	S	S
CO-02	M	S	S	S	S	S	S	S	M	S	M	S	S
CO-03	S	S	M	N	N	S	S	S	S	M	L	N	S
CO-04	S	S	M	N	N	S	S	S	S	M	L	N	S
CO-05	M	S	S	S	L	S	S	S	S	M	S	L	S

Practicals

1. Hemodialysis machine
2. Dialysis Reuse
3. Priming of dialysis apparatus
4. Cardio pulmonary Resuscitation
5. Hemodialysis
6. Permcath
7. Dialyzers
8. Monitoring blood pressure
9. Oxygen administration
10. Blood transfusion

TOTAL: 30 HOURS

SEMESTER V

Sl. No	Course Code	Course Title	L	T	P	C
THEORY						
1.	DT3606	Hemodialysis – I	3	1	0	4
2.	DT3607	Hemodialysis – II	3	1	0	4
3.	DT3608	Hemodialysis – III	3	1	0	4
4.	DT3609	Biomedical Engineering Devices for Renal Dialysis Technology	3	0	0	3
5.	BS36S9	Medical Ethics	2	0	0	2

PRACTICALS						
6.	DT3676	Hemodialysis Laboratory - I	0	0	2	2
7.	DT3677	Hemodialysis Laboratory – II	0	0	2	2
8.	DT3678	Hemodialysis Laboratory - III	0	0	2	2
TOTAL			14	3	6	23

DT3606	HEMODIALYSIS - I	L	T	P	C
		3	1	0	4

OBJECTIVE

It deals with the basic concepts of dialysis, procedure various surgical techniques , complications its compositions and preparations of chemicals used.

Course Outcome – COs At the end of the course,the students will able to,		Cognitive Skill
CO-01	Remember the adequacy of dialysis team rights and responsibilities	R,U,A
CO-02	Understand about the treatment options of RRT	U
CO-03	Understand the basic knowledge of hemodialysis and urea kinetic modeling	A
CO-04	Understand the basics of vascular assess and cannulation techniques	A,R
CO-05	Aware of different HD apparatus, preparation of RO water and distribution	U,E

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO- A	PO- B	PO- C	PO- D	PO- E	PO- F	PO- G	PO- H	PO- - I	PO- J	PO- k	PO- -L	PO- M
CO-01	S	S	S	S	S	M	S	M	S	S	M	M	S
CO-02	S	S	S	S	S	S	S	M	S	S	S	S	S
CO-03	S	S	S	S	S	S	M	S	S	M	S	S	S
CO-04	S	S	S	S	S	M	M	N	L	L	S	S	S
CO-05	S	S	S	S	S	M	S	M	S	S	S	S	S

S- Strong, M- Medium, L-Low, N- Not Relevant

Unit I:

12

History, Types of Dialysis, principles of dialysis, Quantification of adequacy Dialysis Team - Rights - Responsibilities - Lab data analysis - medication in dialysis patients.

Unit II:

12

Treatment options of RRT - decision to start dialysis and withdrawal of dialysis - predialysis patient education - choosing the RRT option - home hemodialysis.

Unit III: 12
 Basics of hemodialysis and urea kinetic modeling - Mechanisms of solute transport - dialyser clearance - kt/v and urea reduction ratio - adequacy in hemodialysis.

Unit IV: 12
 Vascular access for hemodialysis - venous catheters (type, design, location of insertion and methods used, complications of CVC, maintenance of dialysis catheters) - Arteriovenous access AVF/AVG (presurgical evaluation advantages - complications and their management - cannulation techniques - measuring access flow - general measures to reduce infection).

Unit V: 12
 HD apparatus - blood circuit - dialysate circuit - monitors and alarms - pumps - Dialysers - types /structure/membrane/clearance/ high flux & low flux Product water and hemodialysis solution preparation - Contaminants in raw water - water and dialysis solution quality standards - dialysis solution composition - Preparation of RO water and distribution

TOTAL: 60 HOURS

TEXT BOOKS

1. Nissenson and Fine, Dialysis Therapy”.
2. Daugirdas, Blake and Todd,”Handbook of Dialysis”.
3. Heinrich, Principles and practice of dialysis”.
4. John Feehaly,”Comprehensive Clinical Nephrology”.

REFERENCE BOOKS

1. Lippincott Williams and Wilkins,”Handbook of Nutrition and Kidney”.
2. Primer to kidney disease
3. CKD, Dialysis and transplant - A companion to Brenner & Rectors - The Kidney

DT3607	Hemodialysis - II	L	T	P	C
		3	1	0	4

OBJECTIVE

It deals with the basic concepts of anti coagulation along with hemodialysis for acute and chronic renal failure.

Course Outcome – COs At the end of the course,the students will able to,		Cognitive Skill
CO-01	Remember the adequate methods of disinfection and maintenance of RO plant	R
CO-02	Understand about dialyser reuse, its advantages and disadvantages	U
CO-03	Remember the indications and procedure in ARF	R
CO-04	Analyze the indications, complications and various aspects of hemodialysis	An, R
CO-05	Understand the knowledge of anti coagulation	U

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO- A	PO- B	PO- C	PO- D	PO- E	PO- F	PO- G	PO- H	PO- - I	PO- J	PO- k	PO- -L	PO- M
CO-01	S	S	S	S	M	M	L	S	S	S	M	S	S
CO-02	M	S	S	S	S	S	S	S	M	S	M	S	S
CO-03	S	S	M	N	N	S	S	S	S	M	L	N	S
CO-04	S	S	M	N	N	S	S	S	S	M	L	N	S
CO-05	M	S	S	S	L	S	S	S	S	M	S	L	S

S- Strong, M- Medium, L-Low, N- Not Relevant

Unit I :

12

Disinfection of HD machines and maintenance of RO plant - chemicals used and technique of disinfection, advantages.

Unit II:

12

Dialyser reuse - definition methods - advantages and disadvantages of reuse.

Unit III:

12

Hemodialysis for acute renal failure - indications - vascular access - HD prescription - common problems encountered - dialysis for critically ill patients.

Unit IV:

12

Chronic hemodialysis - indications - residual renal function - clearance targets and adequacy - chronic HD prescription - dry weight complications - access recirculation - dialysis disequilibrium.

Unit V :

12

Anticoagulation - factors influencing clotting of extracorporeal circuit - signs of circuit clotting - drugs used for anticoagulation - various protocols - monitoring of anticoagulation - regional anticoagulation.

TOTAL: 60 HOURS

TEXT BOOKS

1. Nissenson and Fine, Dialysis Therapy".
2. Daugirdas, Blake and Todd,"Handbook of Dialysis".
3. Heinrich, Principles and practice of dialysis".
4. John Feehaly,"Comprehensive Clinical Nephrology".

REFERENCE BOOKS

1. Lippincott Williams and Wilkins,"Handbook of Nutrition and Kidney".
2. Primer to kidney disease
3. CKD, Dialysis and transplant - A companion to Brenner & Rectors - The Kidney

DT3607	Hemodialysis - III	L	T	P	C
		3	1	0	4

OBJECTIVE

It deals with the basic concepts of dialysis, procedure various surgical techniques, complications its compositions and preparations of chemicals used.

Course Outcome – COs At the end of the course, students may be able to deal with		Cognitive Skill
CO-01	Causes, complications and management of hypotension	R
CO-02	Etiology and management of renal anaemia	U
CO-03	Concepts of hemofiltration and scuf	U
CO-04	Concepts of SLED	R,A
CO-05	Concepts of plasmapheresis	U,E

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	S	N	M	M	S	N	M	M	M	S	L	L	M
CO-02	M	M	M	L	S	N	M	M	M	S	M	N	M
CO-03	S	M	S	M	M	N	M	M	N	S	N	M	N
CO-04	M	N	M	L	S	N	M	M	M	S	N	L	M
CO-05	N	M	M	M	M	N	M	N	S	M	L	M	M

S- Strong, M- Medium, L-Low, N- Not Relevant

Unit I:

12

Complications of HD - Hypotension(causes and management) - Headaches, Chest pain and back pain, Leg cramps, Dialyser reactions - itching, nausea - Dialysis Disequilibrium (etiology and management) seizures - cardiac arrhythmias - air embolism.

Unit II :

12

Renal anemia and its management - etiology, symptoms, treatment, indications for ESA and target Hb levels - dosing of erythropoietin and its side effects.

Unit III :

12

Hemofiltration/ Hemodiafiltration/ SCUF.

Unit IV:

12

SLED/SLED - f: advantages of SLED, protocols - anticoagulation. CRRT - about CRRT machine and tubings, schematic description of circuit - advantages and disadvantages - indications for CRRT anticoagulation - replacement fluid(dose, pre Vs post filter).

Unit V:**12**

Plasmapheresis - rationale - methods of plasma separation - indications, common diseases for which used protocols complications - anticoagulation for PP.

TOTAL: 60 HOURS**TEXT BOOKS**

1. Nissenson and Fine, Dialysis Therapy”.
2. Daugirdas, Blake and Todd,”Handbook of Dialysis”.
3. Heinrich, Principles and practice of dialysis”.
4. John Feehaly,”Comprehensive Clinical Nephrology”.

REFERENCE BOOKS

1. Lippincott Williams and Wilkins,”Handbook of Nutrition and Kidney”.
2. Primer to kidney disease
3. CKD, Dialysis and transplant - A companion to Brenner & Rectors - The Kidney

DT3609	BIOMEDICAL ENGINEERING DEVICES FOR RENAL DIALYSIS TECHNOLOGY	L	T	P	C
		3	0	0	3

OBJECTIVE

To know about the basics of Biomedical devices and monitoring systems.

Course Outcome – COs At the end of the course,the students will able to		Cognitive Skill
CO-01	Learn about the basics of Biomedical devices	U, An
CO-02	Study about Echocardiogram procedure and result interpretation	R, U, An
CO-03	Learn about patient monitoring system and vital parameters	An,S,U,R
CO-04	Students will understand about pacemaker, TMT and Holter Monitoring	E,An,U
CO-05	Study about the setting up of dialysis machine and know about its components and functions	An, U,R

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	S	S	S	S	S	S	S	S	S	S	S	S	S
CO-02	S	S	S	S	S	S	S	S	S	S	S	S	S
CO-03	S	S	S	S	S	S	S	S	S	S	S	S	S
CO-04	S	S	S	S	S	S	S	S	S	S	S	S	S
CO-05	S	S	S	S	S	S	S	S	S	S	S	S	S

S- Strong, M- Medium, L-Low, N- Not Relevant

Unit I: Basic Biomedical Instruments**9**

BP apparatus stethoscope - ECG machine - physiology of heart - Einthovens triangle - physiology of lungs, cardiovascular system - ECG analysis and interpretation - ECG leads representation, working mechanism of ECG machine - Normal ECG representation. ECG monitoring system - normal ECG values chart - ECG results - ECG reading.

Unit II: Patient Monitoring System**9**

ECG (heart rate), SpO₂, NIBP, sinus rhythm/ ABP (invasive and non invasive blood pressure monitoring) - Functions of patient monitoring system - Physiological monitor - Working principle Objective of patient monitoring system - Pressure transducers (AVP/CVP) - Pulse oximeter Normal range for pulse oximetry - Function of pulse oximeter - Dangerous oxygen level - What happens when blood oxygen levels are too low? - Oxygen saturation - Co oximeter - Photo plethysmogram - Arterial blood gas test - Pulse oximeter uses, readings, indications, applications.

Unit III: Echocardiography**9**

Echocardiogram types - Echo machine 2D and 3 D echo - Echocardiogram procedure in females Echocardiogram results interpretation - Defibrillator define, uses, types, interface with person (history), procedure, training, indication, portable defibrillator, automated external defibrillator.

Unit IV: Pacemaker, Holter and TMT**9**

Pacemaker - internal pacemaker/ Temporary pacemaker, Artificial cardiac pacemaker, Implantable cardioverter defibrillator, Difference between defibrillator and pacemaker, Signs of reading a pacemaker and life expectancy of a person with a pacemaker - Holter monitoring system setting up, function and interpretation - TMT machine - Difference between holter monitor and TMT machine.

Unit V: Dialysis Machine and Dialyser**9**

Dialysis machine setting up of dialysis machine, working mechanism, principles, types of dialysis, components and functions of dialysis machine - Dialyzer working, function, types, parts and dialyzer reaction.

TOTAL: 45 HOURS**TEXT BOOKS**

1. Leslie Cromwell, Biomedical Instrumentation and measurement", Prentice hall of India, New Delhi.
2. Khandpur R.S, Handbook of Biomedical Instrumentation", Tata McGraw - Hill, New Delhi.
3. John G. Webster, Medical Instrumentation Application and Design", John Wiley and sons, New York.

REFERENCE BOOKS

1. Joseph J. Carr and John M. Brown, Introduction to Biomedical equipment technology", John Wiley and sons, New York.

BS36S9	MEDICAL ETHICS	L	T	P	C
		2	0	0	2

OBJECTIVE

To know about ethical issues while practicing in a hospitals

Course Outcome – COs At the end of the course,the students will able to,		Cognitive Skill
CO-01	Understand the role of ethics in medicine	U
CO-02	Remember ethical issues while practicing in a clinic	R
CO-03	Analyze the skills needed to act professionally after making right choices	An
CO-04	Understand the responsibilities especially relevant ethical principles that will enable you to make the right decisions	U
CO-05	Assess the strengths and limitations of the most influential ethical theories	A

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	M	S	S	M	L	S	M	M	S	S	M	S	S
CO-02	S	M	M	L	S	S	M	M	S	L	M	L	S
CO-03	M	M	S	M	S	M	S	M	S	S	S	M	S
CO-04	S	M	S	M	S	M	S	S	M	M	S	S	M
CO-05	M	S	S	S	S	M	S	M	S	S	M	S	S

S- Strong, M- Medium, L-Low, N- Not Relevant

Unit I: Code of Medical Ethics

6

Principle of medical ethics, confidentiality, informed consent, decisions of life sustaining therapy, communication, communication barriers, doctor patient relationship, list of offences and professional misconduct of doctors, , bioethics, role of ethics committees, quality assurance programs, medical etiquette.

Unit II: Advanced Ethical Decisions and Major Laws

6

Advance decisions to refuse treatment, doctor and criminal abortion, ethical issues in stroke management, ethical issues in dementia, quality of life in health care decisions, prenatal diagnostic techniques, regulations and prevention of misuse act 1994 (PNDT act), transplantation of human organs act 1994, medical termination of pregnancy act, labour laws applicable to a hospital, Indian trade union act 1926, industrial dispute act 1947, payment of wages act, employee provident fund act, maternity benefit act.

Unit III: Organizational and Procedural Laws

6

Indian contract act, nursing home registration act, birth death registration act, regulation of genetic counselling center, regulation of prenatal diagnostic technique, determination of sex prohibited Dying declaration - definition, precautions, procedure of recording, special circumstances Death certificate - precautions while issuing death certificate, contents of death certificate, importance of death certificate.

Unit IV:Medical Jurisprudence**6**

Introduction and legal procedure, medico legal aspects of death injuries, medical ethics, consumer protection act, quality of life in health care decisions, ethical issues in health and social care

Unit V:Legal Framework for Hospitals**6**

Introduction to legal framework, patients rights and providers responsibility, medical malpractice, medico legal aspects - impotence, sterility, sterilization and artificial insemination; medico legal aspects of psychiatric and mental health, toxicology, laws related to toxicology, organ transplantation act.

TOTAL:30 HOURS**TEXT BOOKS**

1. Parikh C.K, "Parikhs Textbook of medical jurisprudence and toxicology"., CBS Publications.
2. Jagdish Singh and Bharath Law, "Medical negligence and compensation".
Gurucharan S. Sai. "Medical ethics and elderly", 3rd Edition, Radcliffe publishing Ltd.

DT3676	HEMODIALYSIS LABORATORY - I	L	T	P	C
		0	0	2	2

OBJECTIVE

To know about the concepts of dialysis, procedure various surgical techniques , complications its compositions and preparations of chemicals used.

Course Outcome – COs At the end of the course,the students will able to,		Cognitive Skill
CO-01	Understand the hemodialysis procedure	R,U,A
CO-02	Understand about the pre and post operative care of renal transplantation	U
CO-03	Understand about the setting up of dialysis machine	A
CO-04	Understand the basics of vascular assess and cannulation techniques	A,R
CO-05	Know about water treatment	U,E

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	S	S	S	S	S	M	S	M	S	S	M	M	S
CO-02	S	S	S	S	S	S	S	M	S	S	S	S	S
CO-03	S	S	S	S	S	S	M	S	S	M	S	S	S

CO-04	S	S	S	S	S	M	M	N	L	L	S	S	S
CO-05	S	S	S	S	S	M	S	M	S	S	S	S	S

S- Strong, M- Medium, L-Low, N- Not Relevant

Practicals

1. Types of dialysis
2. Medication in dialysis patients
3. Renal replacement therapy
4. Predialysis patient education
5. Home hemodialysis
6. Vascular access
7. Arteriovenous access
8. Cannulation techniques
9. Hemodialysis blood circuit

TOTAL: 30 HOURS

DT3677	HEMODIALYSIS LABORATORY - II	L	T	P	C
		0	0	2	2

OBJECTIVE

To know about the disinfection, RO Plant, anti coagulation and solutions used in hemodialysis.

Course Outcome – COs At the end of the course, students will be able to,		Cognitive Skill
CO-01	Know the disinfection of hemodialysis machine	R
CO-02	Dialyser reuse, its reprocessing techniques	U
CO-03	Solutions used in dialysis	R
CO-04	Know the RO water treatment	R
CO-05	Understand the importance of anti coagulation and other emergency medications	U

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	S	S	S	S	M	M	L	S	S	S	M	S	S
CO-02	M	S	S	S	S	S	S	S	M	S	M	S	S
CO-03	S	S	M	N	N	S	S	S	S	M	L	N	S
CO-04	S	S	M	N	N	S	S	S	S	M	L	N	S
CO-05	M	S	S	S	L	S	S	S	S	M	S	L	S

S- Strong, M- Medium, L-Low, N- Not Relevant

Practicals

1. Disinfection of hemodialysis patients
2. RO treatment
3. Dialyser
4. Anticoagulation during hemodialysis
5. Citrate dialysate
6. Chemicals used in hemodialysis
7. Dialysis solutions
8. Vascular access.

TOTAL:30HOURS

DT3678	HEMODIALYSIS LABORATORY - III	L	T	P	C
		0	0	2	2

OBJECTIVE

It deals with the basic concepts of Renal replacement therapy, Renal transplantation, Renal biopsy and Renal function tests.

Course Outcome – COs At the end of the course, the students will be able to,		Cognitive Skill
CO-01	Causes, complications and management of hypotension	R
CO-02	Etiology and management of renal anaemia	U
CO-03	Concepts of haemofiltration and scuf	U
CO-04	Concepts of SLED	R,A
CO-05	Concepts of plasma pheresis	U,E

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	S	N	M	M	S	N	M	M	M	S	L	L	M
CO-02	M	M	M	L	S	N	M	M	M	S	M	N	M
CO-03	S	M	S	M	M	N	M	M	N	S	N	M	N
CO-04	M	N	M	L	S	N	M	M	M	S	N	L	M
CO-05	N	M	M	M	M	N	M	N	S	M	L	M	M

Practicals

1. Sustained low efficiency dialysis
2. Slow continuous ultrafiltration
3. Renal replacement therapy
4. Renal transplantation
5. Renal biopsy
6. Renal function tests
7. Arteriovenous fistula
8. Priming of dialysis apparatus

TOTAL: 30 HOURS

SEMESTER VI

Sl. No	Course Code	Course Title	L	T	P	C
THEORY						
1.	DT3610	Peritoneal Dialysis	3	1	0	4
2.	DT3611	Dialysis in Special Situations	3	1	0	4
3.	DT3612	Renal Disorders	3	1	0	4
4.	DT3613	Renal Transplantation	3	0	0	3
5.	BS36S0	Hospital Management	2	0	0	2
CLINICAL POSTINGS & PRACTICALS						
6.	DT3679	Peritoneal Dialysis Laboratory	0	0	2	2
7.	DT3680	Dialysis in Special Situations Laboratory	0	0	2	2
8.	DT3681	Renal Disorders Laboratory	0	0	2	2
TOTAL			14	3	6	23

DT3610	PERITONEAL DIALYSIS	L	T	P	C
		3	1	0	4

OBJECTIVE

To deals with the concept of student aware of various aspects of peritoneal dialysis, common cause of fluid overload and complications.

Course Outcome – COs AT the end of the course, the students will able to,		Cognitive Skill
CO-01	Remember the functional anatomy, physiology of peritoneum will able	R
CO-02	Understand the apparatus for PD, catheter designs, procedure and its complications	U
CO-03	Analyze the hybrid forms of PD and nutrition	A
CO-04	Evaluate the fluid overload and concepts of peritonitis	E
CO-05	Understand the metabolic and mechanical complications of PD	U

R- Remember, U-Understand, A-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO \ CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	S	S	S	N	S	S	M	S	M	M	S	M	L
CO-02	S	S	S	S	S	S	S	S	S	S	S	S	M
CO-03	S	S	S	M	S	S	L	S	S	L	S	S	M
CO-04	M	S	S	S	S	S	L	S	S	S	S	M	M
CO-05	S	S	S	S	S	S	S	S	S	S	S	M	S

S- Strong, M- Medium, L-Low, N- Not Relevant

Unit I: **12**
Functional anatomy of peritoneum - models of peritoneal transport - physiology of peritoneal transport - PET test - peritoneal clearance and clearance targets.

Unit II: **12**
Apparatus for PD - peritoneal Dialysis solutions - PD catheter designs and placement - catheter break in procedures - complications of PD catheters (leaks, outflow failure, catheter infections, hernias).

Unit III: **12**
Common APD and CAPD prescriptions - advantages of cyclers - hybrid forms of PD - how to improve peritoneal kt/v - nutrition in CAPD.

Unit IV: **12**
Causes of fluid overload in CAPD - ultrafiltration failure, preserving residual renal function - Peritonitis and exit site infections - potential routes of infection diagnosis - common organisms - drugs used and drug delivery methods.

Unit V : **12**
Mechanical complications (hernias, abdominal wall edema, hydrothorax,) - metabolic complications (glucotoxicity, lipid abnormalities, electrolyte abnormalities, protein)

TOTAL: 60 HOURS

TEXT BOOKS

1. Nissenson and Fine, Dialysis Therapy”.
2. Daugirdas, Blake and Todd,”Handbook of Dialysis”.
3. Heinrich, Principles and practice of dialysis”.
4. John Feehaly,”Comprehensive Clinical Nephrology”.

REFERENCE BOOKS

1. Lippincott Williams and Wilkins,”Handbook of Nutrition and Kidney”.
2. Primer to kidney disease
3. CKD, Dialysis and transplant - A companion to Brenner & Rectors - The Kidney

DT3611	DIALYSIS IN SPECIAL SITUATION	L	T	P	C
		3	1	0	4

OBJECTIVE To deals with the concept of dialysis done for poisoning, pregnancy, HIV positive and CCF patients

Course Outcome – COs At the end of the course, the students will able to,		Cognitive Skill
CO-01	Concepts of hemoperfusion and dialysis for poisoning	R
CO-02	Dialysis done for children	U
CO-03	Dialysis done in pregnancy	U

CO-04	Dialysis done for HIV positive patients	R,A
CO-05	Advances in dialysis technology	U,E

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO- A	PO- B	PO- C	PO-D	PO- E	PO- F	PO- G	PO- H	PO - I	PO- J	PO- k	PO - L	PO- M
CO-01	S	N	M	M	S	N	M	M	M	S	L	L	M
CO-02	M	M	M	L	S	N	M	M	M	S	M	N	M
CO-03	S	M	S	M	M	N	M	M	N	S	N	M	N
CO-04	M	N	M	L	S	N	M	M	M	S	N	L	M
CO-05	N	M	M	M	M	N	M	N	S	M	L	M	M

S- Strong, M- Medium, L-Low, N- Not Relevant

Unit I:Dialysis for Congestive Cardiac Failure and Poisoning Patients

12

Use of hemoperfusion and dialysis for poisoning cases - common indications for HP/HD, drugs which can be removed (acetaminophen, salicylates, digoxin, barbiturates, toxic alcohols, lithium, anticonvulsants) congestive cardiac failure.

Unit II:Dialysis in Children

12

Dialysis in children - choice between Peritoneal dialysis and Hemodialysis - problems with vascular access - HD prescription in children - nutrition and growth related issues.

Unit III:Dialysis in Pregnancy

12

Dialysis in pregnancy - causes for AKI in pregnancy - dialysis regimen during pregnancy - indications for dialysis in pregnancy.

Unit IV:Dialysis in HIV/ HBsAg/ HCV Positive Patients

12

Dialysis in HIV/ HBsAg/ HCV positive patients - Guidelines, infection control practices in HD units - dedicated machines - vaccination for dialysis patients.

Unit V:Recent Advances in Dialysis Technology

12

MARS dialysis dialysis in advanced liver disease nocturnal hemodialysis Newer peritoneal dialysis solutions home hemodialysis.

TOTAL: 60 HOURS

TEXT BOOKS

1. Nissenson and Fine, Dialysis Therapy”.
2. Daugirdas, Blake and Todd,”Handbook of Dialysis”.
3. Heinrich, Principles and practice of dialysis”.
4. John Feehaly,”Comprehensive Clinical Nephrology”.

REFERENCE BOOKS

1. Lippincott Williams and Wilkins,”Handbook of Nutrition and Kidney”.
2. Primer to kidney disease
3. CKD, Dialysis and transplant - A companion to Brenner & Rectors - The Kidney

DT3612	RENAL DISORDERS	L	T	P	C
		3	1	0	4

OBJECTIVE

To deals with the concept of increasing exposure of students to various Renal diseases.

Course Outcome – COs At the end of the course,the students will able to,		Cognitive Skill
CO-01	Basic clinical examination and associated test for renal patients	R
CO-02	Basic concepts of fluid and electrolyte balance	U
CO-03	Different glomerular diseases	U
CO-04	Changes of renal system with respective to various diseases	R,A
CO-05	Injuries of kidney and their management	U,E

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	S	N	M	M	S	N	M	M	M	S	L	L	M
CO-02	M	M	M	L	S	N	M	M	M	S	M	N	M
CO-03	S	M	S	M	M	N	M	M	N	S	N	M	N
CO-04	M	N	M	L	S	N	M	M	M	S	N	L	M
CO-05	N	M	M	M	M	N	M	N	S	M	L	M	M

S- Strong, M- Medium, L-Low, N- Not Relevant

Unit I:Assessment of Renal Disease

12

History and clinical examination of patients with renal disease - Urinalysis and microscopy - Clinical assessment of renal function - Renal function in the newborn infant - The aging kidney - Imaging in renal disease - Renal biopsy - Immunological investigation of renal disease.

Unit II:Fluid and Electrolyte Disorders

12

Hypo/hyponatremia - disorders of water balance - Hypo/hyperkalemia - Hypo/hypercalcemia Hypo/hyperphosphatemia - Hypo/hypomagnesaemia - Clinical acidbase disorders

Unit III:Glomerular Diseases

12

Proteinuria - Nephrotic syndrome - Minimal change disease - Focal segmental glomerulosclerosis - Immunoglobulin A nephropathy - Membranous nephropathy - glomerulonephritis.

Unit IV:Kidney in Various Diseases

12

Diabetes mellitus Amyloidosis - Plasma cell dyscrasias Sarcoidosis - Systemic vasculitis - Sysemic lupus erythematosus - Rheumatoid arthritis - sjgrens syndrome UTI - renal stone.

Unit V:Kidney Injuries and its Management**12**

AKI CKD Hemodialysis - hemofiltration and hemodiafiltration - peritoneal dialysis - Psychological aspects of treatment for renal failure.

TOTAL: 60 HOURS**TEXT BOOKS**

1. John L. Hennessey and David A. Patterson, Computer Architecture A Quantitative Approach”, Morgan Kaufmann / Elsevier, 5th edition, 2012.

REFERENCE BOOKS

1. John L. Hennessey and David A. Patterson, Computer Architecture A Quantitative Approach”, Morgan Kaufmann / Elsevier, 5th edition, 2012.

DT3613	RENAL TRANSPLANTATION	L	T	P	C
		3	0	0	3

OBJECTIVE

To deals with the concept of the operative procedure immunology and pharmacology.

Course Outcome – COs		Cognitive Skill
At the end of the course,the students will able to,		
CO-01	Diagnostic categories for kidney transplantation	R,U,A
CO-02	Pre and post transplant medical considerations	R,U,E
CO-03	Transplant immunology, anesthesia and pharmacology	R,U,A
CO-04	Operative techniques and implantation	An,R,U
CO-05	Post transplant considerations	E,An,R, U

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	M	S	S	S	L	S	S	S	M	S	M	M	S
CO-02	M	S	S	S	L	S	S	S	M	S	S	M	S
CO-03	M	S	S	M	L	S	M	S	L	S	L	S	S
CO-04	M	S	S	S	L	S	S	S	M	S	S	S	S
CO-05	M	S	S	S	L	S	S	S	M	S	M	M	S

S- Strong, M- Medium, L-Low, N- Not Relevant

Unit I:**9**

Overview of kidney transplantation - diagnosis and diagnostic categories for kidney transplantation - recipient evaluation.

Unit II: 9

Pre and post transplant medical considerations fluids and electrolytes, cardiac evaluation - pulmonary evaluation - hematologic evaluation - gastroenterology and hepatology evaluation nutritional care infections - Donor evaluation deceased donor management - donor kidney scoring systems - deceased donor considerations - infectious risks associated with donors - live donor evaluation - psychiatric evaluation of live donors.

Unit III: 9

Immunology and pharmacology - Transplant immunology - immune risk profiling - HLA and ABO desensitization - kidney paired donation pharmacology - anesthesia.

Unit IV: 9

Operative techniques - Live donor nephrectomy - deceased donor procurement implantation - minimally invasive kidney transplantation - implantation techniques - complications.

Unit V: 9

Post transplant considerations - Postoperative guidelines, allograft function rejection - recurrent glomerular diseases after kidney transplantation - vascular complications - allograft nephrectomy - urologic complications and fluid collections - post transplant malignancies.

TOTAL: 45 HOURS

TEXT BOOKS

1. Nissenson and Fine, Dialysis Therapy”.
2. Daugirdas, Blake and Todd,”Handbook of Dialysis”.
3. Heinrich, Principles and practice of dialysis”.
4. John Feehaly,”Comprehensive Clinical Nephrology”.

REFERENCE BOOKS

1. Lippincott Williams and Wilkins,”Handbook of Nutrition and Kidney”.
2. Primer to kidney disease
3. CKD, Dialysis and transplant - A companion to Brenner & Rectors - The Kidney Stuart J.Knechtle,” Kidney Transplantation Principles and Practice”, Elsevier Publications

BS36S0	HOSPITAL MANAGEMENT	L	T	P	C
		2	0	0	2

OBJECTIVE

To deals with the concept of quality management,hospital information system,inventory control,occupational health safety and bio medical waste management.

Course Outcome – COs AT the end of the course,tne students will able to,		Cognitive Skill
CO-01	Understand the quality management	U
CO-02	Analyze the hospital information system.	A
CO-03	Remember the inventory control.	R

CO-04	Evaluate occupational health and safety.	E
CO-05	Apply the knowledge in biomedical waste management.	A

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO- A	PO- B	PO- C	PO- D	PO- E	PO- F	PO-G	PO- H	PO- I	PO- J	PO-k	PO-L	PO-M
CO-01	S	S	L	S	M	N	S	S	S	L	N	M	S
CO-02	L	L	M	S	S	L	N	S	M	M	N	S	S
CO-03	S	S	L	S	S	S	L	N	S	M	S	L	L
CO-04	L	L	M	L	S	L	S	M	M	S	N	L	S
CO-05	N	L	S	L	S	M	S	N	S	N	L	S	L

S- Strong, M- Medium, L-Low, N- Not Relevant

Unit I:Quality Management

6

Quality Concepts: Definition of Quality, Dimensions of Quality, Basic concepts of Total Quality Management, Quality Awards - Accreditations for hospitals: Understanding the process of getting started on the road to accreditation, National and International Accreditation bodies, overview of standards - ISO (9000 & 14000 environmental standards), NABH, NABL, JCI, JACHO.

Unit II:Hospital Information System

6

Hospital Information System: Hospital Information System Management and software applications in registration, billing, investigations, reporting, ward management and bed distribution, medical records management, materials management and inventory control, pharmacy management, dietary services, management, information processing. Security and ethical challenges.

Unit III:Inventory Control

6

Inventory Control: Concept, various costs of inventory, Inventory techniques - ABC, SDE / VED Analysis, EOQ models - Storage: Importance and functions of storage - Location and layout of stores - Management of receipts and issue of materials from stores, Warehousing costs, Stock verification.

Unit IV:Occupational Health and Safety

6

Occupational health, occupational safety, aims and objectives, common occupational hazards in hospitals, occupational hazards in emergency unit, general methods of prevention of occupational diseases, personal protective equipments, role of health care professionals in prevention of occupational hazards or diseases.

Unit V:Biomedical Waste Management

6

Biomedical Waste Management: Meaning, Categories of Biomedical Wastes, Colour code practices, Segregation, Treatment of biomedical waste - Incineration and its importance - Standards for waste autoclaving, Microwaving - Packaging, Transportation & Disposal of Biomedical wastes.

TOTAL: 30 HOURS

TEXT BOOKS

1. Goel S L & Kumar R. 2004. Hospital Core Services: Hospital Administration of the 21st Century. Deep Deep Publications Pvt Ltd: New Delhi
2. Harris M G & Assoc. 2003. Managing Health Service: Concepts & Practices. MacLennan + Petty: Sydney
3. Kelly D L. 2006. Encyclopaedia of Quality Management in Hospitals & Health Care Administration. Vol 1 - 6. Pentagon Press: Chicago

REFERENCE BOOKS

1. Kilpatrick A O & Johnson J A. 1999. Handbook of Health Administration & Policy. Marcel DekkesInc: New York
2. Kumar A. 2000. Encyclopaedia of Hospital Administration & Development: Volume I. Anmol Publications Ltd: New Delhi.
3. Ransom S B, Joshi M S & Nash D B. 2006. The Health Care Quality Book: Vision, Strategy & Tools. Standard Publishers Distributors: Delhi
4. Reddy N K S. 2000. Medical Jurisprudence & Toxicology. ALT Publications: Hyderabad

DT3679	PERITONEAL DIALYSIS LABORATORY	L	T	P	C
		0	0	2	2

OBJECTIVE

To deals with the concept of student aware of various aspects of peritoneal dialysis,common cause of fluid overload and complications

Course Outcome – COs At the end of the course, students will be able to,		Cognitive Skill
CO-01	Know the functional anatomy of peritoneum	R
CO-02	Understand the procedure Automated peritoneal dialysisl	U
CO-03	Determine the Peritoneal equilibration test and solutions used for peritoneal dialysis	A
CO-04	Deals with Continuous ambulatory peritoneal dialysis	E
CO-05	Understand the mechanical complications of PD and its care	U

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	S	S	S	N	S	S	M	S	M	M	S	M	L
CO-02	S	S	S	S	S	S	S	S	S	S	S	S	M
CO-03	S	S	S	M	S	S	L	S	S	L	S	S	M
CO-04	M	S	S	S	S	S	L	S	S	S	S	M	M
CO-05	S	S	S	S	S	S	S	S	S	S	S	M	S

S- Strong, M- Medium, L-Low, N- Not Relevant

Practicals

1. Anatomy of peritoneum
2. Physiology of peritoneum transport
3. Peritoneal equilibration test
4. Peritoneal dialysis solutions
5. Automated peritoneal dialysis
6. Continuous ambulatory peritoneal dialysis
7. Nutrition in CAPD
8. Complications of peritoneal dialysis

TOTAL: 30HOURS

DT3680	DIALYSIS IN SPECIAL SITUATIONS LABORATORY	L	T	P	C
		0	0	2	2

OBJECTIVE

To deals with the concept of dialysis done for poisoning, pregnancy, HIV positive and CCF patients.

Course Outcome – COs At the end of the course, students will be able to,		Cognitive Skill
CO-01	Concepts of heamoperfusion and dialysis for poisoning	R
CO-02	Dialysis done for children	U
CO-03	Dialysis done in pregnancy	U
CO-04	Dialysis done for HIV positive patients	R,A
CO-05	Know about advances in dialysis technology	U,E

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	S	N	M	M	S	N	M	M	M	S	L	L	M
CO-02	M	M	M	L	S	N	M	M	M	S	M	N	M
CO-03	S	M	S	M	M	N	M	M	N	S	N	M	N
CO-04	M	N	M	L	S	N	M	M	M	S	N	L	M
CO-05	N	M	M	M	M	N	M	N	S	M	L	M	M

S- Strong, M- Medium, L-Low, N- Not Relevant

Practicals

1. Hemodialysis
2. Peritoneal dialysis
3. Vascular access
4. Renal replacement therapy

5. Renal biopsy
6. Renal transplantation
7. AV cannulation
8. MARS dialysis

TOTAL:30HOURS

DT3681	RENAL DISORDER LABORATORY	L	T	P	C
		0	0	2	2

OBJECTIVE

To deals with the concept of increasing exposure of students to various Renal diseases

Course Outcome – COs At the end of the course, students will be able to,		Cognitive Skill
CO-01	Basic clinical examination and associated test for renal patients	R
CO-02	Basic concepts of fluid and electrolyte balance	U
CO-03	Deals with different glomerular diseases	U
CO-04	Deals with changes of renal system with respective to various diseases	R,A
CO-05	Deals with injuries of kidney and their management	U,E

R- Remember, U-Understand, A-Apply, An-Analyze, E-Evaluate, S- Synthesis

Mapping of Course Outcome with Programme Outcome

PO CO	PO-A	PO-B	PO-C	PO-D	PO-E	PO-F	PO-G	PO-H	PO-I	PO-J	PO-k	PO-L	PO-M
CO-01	S	N	M	M	S	N	M	M	M	S	L	L	M
CO-02	M	M	M	L	S	N	M	M	M	S	M	N	M
CO-03	S	M	S	M	M	N	M	M	N	S	N	M	N
CO-04	M	N	M	L	S	N	M	M	M	S	N	L	M
CO-05	N	M	M	M	M	N	M	N	S	M	L	M	M

6 S- Strong, M- Medium, L-Low, N- Not Relevant

Practicals

1. Renal circulation
2. Renal function test
3. Acid base balance
4. Oxygen administration
5. CPR
6. Total parenteral nutrition
7. Abdominal paracentesis
8. Renal diet
9. Fluid and electrolyte balance
10. Intravenous pyelogram

TOTAL:30 HOURS

IV Year - Internship

One year internship finally prepares and trains the student who will be able to meticulously assist the doctors for providing quality patient care in selected areas of clinical speciality.

Guidelines

- Internships are mandatory
- Duration: 1 Year (During 7th & 8th semester)
- Internship can be done at NABH Certified Hospitals, Government Hospitals etc.
- Maintenance of records by students: Every student shall maintain records of the attendance and the report of the work they do in different areas. This should be certified by the head of the institutions or his/her nominee where the students is undergoing internship.
- Leave: Candidates should have an attendance of at least 100% during the internship period.
- Grading and evaluation of students: All interneers will be assessed based on their attendance.
- Certification: The institutes will award a certificate and Clinical requirements after successful completion of the internship.
- The university shall award the degree only after the successful completion of internship.