



**Dr.M.G.R.**  
**Educational and Research Institute**  
**(DEEMED TO BE UNIVERSITY)**  
(An ISO Certified Institution)  
**University with Graded Autonomy Status**  
Maduravoyal , Chennai - 600 095



## **FACULTY OF ALLIED HEALTH SCIENCE**

### **B.Sc., RENAL DIALYSIS TECHNOLOGY**

#### **Regulation, Curriculum and Syllabus**

**2020**



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## **Regulations for B.Sc. (Allied Health Science) Courses**

### **Introduction:**

**B.Sc. (Allied Health Science), a (3-year course work + 1-year internship)** program under the **Faculty of Allied Health Sciences**, is aimed at training students who will be able to meticulously assist the doctors for providing quality patient care in selected areas of clinical speciality. This program is a taught course that covers relevant topics and specialized areas of knowledge as opted. The aim of this B.Sc. program is to provide a thorough training to the candidates through formal lectures and/or seminars and practical programs which culminate in a one year internship that finally prepares the student for the rigors of the medical world.

### **1. Short Title and Commencement:**

These Regulations shall be called the “Regulations for B.Sc. (Allied Health Science) Course” of Dr. M.G.R Educational and Research Institute. These regulations shall come into force from the academic year 2020-2021. These regulations are subject to modifications as may be approved by the Academic Council from time to time.

### **2. Eligibility for Admission:**

- a) A candidate desiring to join the (3-year course work + 1-year internship) program, leading to the degree B.Sc. (Allied Health Science) should have passed the HSC/CBSE/ISC or equivalent examination with one of the following subject combinations:
  - i) Physics, Chemistry, Biology ( Eligible for all AHS courses )
  - ii) Physics, Chemistry, Botany and Zoology ( Eligible for all AHS courses )
  - iii) Physics, Chemistry, Biology, biochemistry( Eligible for all AHS courses )
  - iv) Physics, Chemistry, Biology, nutrition dietetics (for B.Sc., Clinical nutrition only)
  - v) Physics, Chemistry, Mathematics (for B.Optom only)
- b) A candidate shall, at the time of admission submit to the Head of the Institution, a certificate of medical fitness from an authorized Medical Officer certifying that the candidate is physically fit to undergo the academic course and does not suffer from any disability or contagious disease.

### **3. Age limit for admission**

A candidate should have completed the age of 17 years or would complete the age as on 31<sup>st</sup> December of the year of admission to the B.Sc., Allied Health Science Course.

### **4. Eligibility Certificate**

Candidates, who have passed any qualifying examination other than the Higher Secondary Course examination conducted by the Government of Tamil Nadu, shall obtain an Eligibility Certificate from Dr. M.G.R Educational and Research Institute and produce the same at the time of admission.

### **5. Registration**

A candidate admitted to the course shall register his/her name with the University by submitting the application form for registration, duly filled in along with the prescribed fee, through the Head of the Institution within the stipulated date.

### **6. Duration of the course**

The duration of the B.Sc. (Allied Health Science) Degree Course shall be 3-year course work comprising of 6(six) semesters and one year (semesters 7 & 8) of compulsory internship. The candidate is required to pursue the course on a full time basis, and must complete the course within seven years from the date of provisional registration.

### **7. Commencement of the Course:**

The course shall ordinarily commence by the month of August of the academic year.

### **8. Curriculum:**

The Curriculum and syllabus for the course shall be as specified in the annexure to these regulations which are subject to modifications by the standing

Academic Board from time to time.

(i) The first three years of the course will be utilized as follows:

- The first two semesters will be spent on Basic nutrition, Applied Microbiology, Family meal management, Clinical Nutrition, Advanced Nutrition, Physiology, Allied chemistry, Physics, English and Communication skills, Introduction to Computers, and Pharmacology.

- Specialized training in the concerned speciality will be offered during the third, fourth, fifth and sixth semesters.

(ii) The fourth year of the course shall be compulsory internship in the respective speciality.

## **9. Medium of Instruction:**

English shall be the medium of instruction for all the subjects of study and for the examination.

## **10. Working Days:**

Each semester shall consist of not less than 100 working days and each academic year shall have a total of 200 working days or above in the first to Sixth Semesters. In the Seventh and Eighth semesters, each semester shall have a minimum of 120 working days.

## **11. Attendance:**

The candidate shall have not less than 80% attendance in Theory and Practical separately. Each semester shall be taken as a unit for the purpose of calculating the attendance. The candidate lacking attendance in a subject shall be denied permission to appear for the University Examination in that subject.

## **12. Condonation of Lack of Attendance:**

The discretionary power of condonation of shortage of attendance to appear for University Examination rests with the University.

Lack of attendance can be condoned up to a maximum of 10% of the minimum attendance required in the following exceptional circumstances:

- (i) Any illness/ accident (for which Medical certificate from a registered medical practitioner must be produced)
- (ii) Any unforeseen tragedy in the family (should produce the letter from the parent/guardian)
- (iii) Participation in NCC/NSS and other co-curricular activities representing the Institution / University. (Certificate from competent authority is required)

For any of the above reasons, request shall be made by the candidate with prescribed fees to the Controller of Examination through proper channel, ten days prior to the commencement of the theory examination.

### **13. Commencement of the examinations**

There shall be two sessions of University examinations in an academic year, viz., February and August.

### **14. Continuous (Internal) Assessment:**

Continuous (Internal) Assessment for Theory shall be the average of the best two out of three.

Continuous (Internal) Assessment for Practical shall be the average of the best two out of three.

### **15. Semester - End Examination (University/Department):**

a. The examination in B.Sc. (Allied Health Science) shall consist of Written Theory examinations and Practical examinations. The Semester - End Examination (University/Department) shall be conducted at the end of each semester.

b. Papers for which Internal Examination is recommended by the Board of Studies and approved by the Academic Council, the date of Semester - End Examinations (Internal examinations) shall be as per the University guidelines.

**16. Pattern of Semester - End Examination (University/Department):**

**EXAMINATION PATTERN**

**SEMESTER-I AND SEMESTER-II (FOR ALL SPECIALITIES)**

**THEORY**

**MARKS-** 60 Marks

**DURATION** -2<sup>1</sup>/<sub>2</sub> Hours

**PART –A (Answer any one from Two)**

I. Essay (1x15=15 Marks)

**PART-B (Answer all questions)**

II. Short Notes (5x5=25 Marks)

**PART-C (Answer all questions)**

III. Short answers (10x2=20 Marks)

**PRACTICAL**

Practical (including Orals) 15 Marks

**CONTINUOUS (INTERNAL) ASSESSMENT**

Theory 20 Marks

Practical 5 Marks

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**TOTAL 100 Marks**

## **SEMESTER III – SEMESTER VI**

### **Duration -3hours**

#### **Theory**

**80 marks**

#### **Section –A (Answer any TWO from THREE)**

I. Essay (2x15=30)

#### **Section-B (Answer any EIGHT from TEN)**

II. Short notes (8x5=40)

#### **Section-C (Answer all questions)**

III. Very short notes (5x2=10)

### **Internal assessment**

Based on CAT Exams (I,II,III& Model)

**20 marks**

**TOTAL**

**100 Marks**

### **Practicals Pattern**

**80 marks**

- |                               |          |
|-------------------------------|----------|
| 1. Spotters                   | 20 marks |
| 2. Viva (Theory & Practicals) | 20 marks |
| 3. Charts/stations            | 20 marks |
| 4. Record                     | 20 marks |

### **Internal assessment**

**20 marks**

- Attendance
- Based on CAT exams
- Log book

**TOTAL**

**100 Marks**

## **17. Marks Qualifying for a Pass:**

For passing the University/End-Semester Examination from Semester I to Semester VI, the candidate shall secure the marks as stated below,

- 40% minimum in the University End-Semester Theory examination
- 40% minimum in the University End-Semester Practical examination
- 40% of marks in the subject where internal evaluation alone is conducted
- 40% of aggregate of theory, practical and internal assessment taken together

## **18. Classification of successful candidates:**

- a) Successful candidates who secure 75% marks and above as a course aggregate in the first appearance taking University theory, practical, and project/dissertation evaluation shall alone be awarded Distinction. This will also apply for award of University rank.
- b) Successful candidates who secure 60% marks and above as a course aggregate in the University theory, practical, project/dissertation evaluation and viva shall be awarded First Class.
- c) All others who secure 40-59% in gross percentage will be classified to have passed in Second Class.

## **19. Revaluation of answer papers**

There shall be revaluation and retotaling of answer papers of failed candidates. Failed candidates are however, permitted to apply to the University within fifteen days of publication of the results for revaluation and retotaling.

## **20. Carry- over of failed subjects**

- 1) A candidate has to pass in theory and practical examinations separately in each of the paper.
- 2) If the candidate fails either in theory or practical examinations, he/she has to reappear for both (theory and practical)
- 3) The student shall start the Internship training (VII & VIII semester) only after he/she clears all the papers from Semester I to Semester VI.



## **21. Temporary break of study**

- a) A candidate is not normally permitted to temporarily break the study.
- b) If a candidate is continuously absent from the institute for four or more weeks,
  - i) Having notified the Dean/Director/Principal within this period, this absence shall be treated as “Temporary Break of Study”.
  - ii) Without notifying the Dean/Director/Principal, his/her name will be removed from the institute rolls.
- c) If a candidate is compelled to temporarily break the study for valid reasons (such as accident or hospitalization due to prolonged ill health), he/she shall apply for condonation of the break to the Dean/Director/Principal through the Head of the Department.
- d) For condonable break of study:
  - i) If the lack of attendance is within condonable limits as per Clause No. 12, the candidate shall be permitted to write the examination for the current semester.
  - ii) If there is non-condonable lack of attendance, the candidate shall rejoin the program at the respective semester as and when it is offered after the break and shall be governed by the rules and regulations in force at the time of rejoining.
- e) The total period for completion of the program reckoned from the commencement of the semester to which the candidate was first admitted shall not exceed the maximum period specified in Clause No.6 irrespective of the period of break of study in order that he/she may be qualified for the award of the degree.
- f) In any case, a candidate shall be permitted to temporarily break the study only once during the entire duration of the program. The candidate shall forfeit the registration in case of a second break or in case of a non-condonable break of study.
- g) Without prejudice to the above rules, the candidate who has completed the attendance requirement for a semester, but has proceeded on a condonable break of study without appearing for the University Examination, shall be permitted to appear for the examinations without repeating the semester and thereafter continue the subsequent semester.

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 (Declared u/s.3 of the UGC Act, 1956)  
**FACULTY OF ALLIED HEALTH SCIENCES**  
**SCHEME OF EXAMINATION**  
**SEMESTER – I**

**TOTAL HOURS: 330**

S.No.	Paper	Hours/ Semester		Evaluation (Marks)				
		Lecture	Practical	Continuous Assessment (Internals)		End Semester examination (University/Department Exams)		Total
				Theory	Practical	Theory	Practical	
1	Anatomy –I (UE)	40	20	20	5	60	15	100
2	Physiology –I (UE)	40	20	20	5	60	15	100
3	Biochemistry –I (UE)	40	20	20	5	60	15	100
4	Microbiology –I (UE)	40	20	20	5	60	15	100
5	Pathology –I (UE)	40	20	20	5	60	15	100
6	English (IE)	30	-	-	-	50	-	50

**UE- UNIVERSITY EXAMINATION**  
**IE- INTERNAL EXAMINATION**

**SEMESTER – II****TOTAL HOURS: 420**

S.No.	Paper	Hours / Semester		Evaluation (Marks)				
		Lecture	Practical	Continuous Assessment (Internals)		End Semester examination (University/Department Exams)		Total
				Theory	Practical	Theory	Practical	
1	Anatomy –II (UE)	40	20	20	5	60	15	100
2	Physiology –II (UE)	40	20	20	5	60	15	100
3	Biochemistry –II (UE)	40	20	20	5	60	15	100
4	Microbiology –II (UE)	40	20	20	5	60	15	100
5	Pathology –II (UE)	40	20	20	5	60	15	100
6	Pharmacology (UE)	40	20	20	5	60	15	100
7	Physics (IE)	30	-	-	-	50	-	50
8	Computer Science (IE)	30	-	-	-	50	-	50

**UE- UNIVERSITY EXAMINATION****IE- INTERNAL EXAMINATION**

**SEMESTER – III (RENAL DIALYSIS TECHNOLOGY)**

**TOTAL HOURS: 420**

S.No.	Paper	Hours/ Semester		Evaluation (Marks)				
		Lecture	Practical	Continuous Assessment (Internals)		End Semester examination (University/Department Exams)		Total
				Theory	Practical	Theory	Practical	
1	Applied Anatomy and Physiology related to Renal Dialysis Technology -Theory (UE)	60	-	20	-	80	-	100
2	Applied Anatomy and Physiology related to Renal Dialysis Technology -Practicals(UE)	-	120	-	20	-	80	100
3	Applied Pharmacology related to Renal Dialysis Technology - Theory (UE)	60	-	20	-	80	-	100
4	Applied Pharmacology related to Renal Dialysis Technology - Practicals(UE)	-	120	-	20	-	80	100
5	Medical Ethics and Biosafety - Theory (IE)	30	-	-	-	50	-	50
6	Psychology - Theory (IE)	30	-	-	-	50	-	50

**UE- UNIVERSITY EXAMINATION**

**IE- INTERNAL EXAMINATION**

**SEMESTER – IV (RENAL DIALYSIS TECHNOLOGY)**

**TOTAL HOURS: 420**

S.No.	Paper	Hours / Semester		Evaluation (Marks)				
		Lecture	Practical	Continuous Assessment (Internals)		End Semester examination (University/Department Exams)		Total
				Theory	Practical	Theory	Practical	
1.	Concepts of disease and outlines of clinical evaluation related to Renal Dialysis Technology Paper - I Theory (UE)	60	-	20	-	80	-	100
2.	Concepts of disease and outlines of clinical evaluation related to Renal Dialysis Technology Paper - I Practical (UE)	-	120	-	20	-	80	100
3.	Concepts of disease and outlines of clinical evaluation related to Renal Dialysis Technology Paper - II Theory (UE)	60	-	20	-	80	-	100
4.	Concepts of disease and outlines of clinical evaluation related to Renal Dialysis Technology Paper - II Practical (UE)	-	120	-	20	-	80	100
5.	Basics and Advanced Life Support - Theory (IE)	30	-	-	-	50	-	50
6.	Sociology - Theory (IE)	30	-	-	-	50	-	50

**UE- UNIVERSITY EXAMINATION**

**IE- INTERNAL EXAMINATION**

**SEMESTER – V (RENAL DIALYSIS TECHNOLOGY)**

**TOTAL HOURS : 450**

S.No	Paper	Hours / Semester		Evaluation (Marks)				
		Lecture	Practical	Continuous Assessment (Internals)		End Semester examination (University/Department Exams)		Total
				Theory	Practical	Theory	Practical	
1	Renal Dialysis Technology - Part I - Paper I Theory (UE)	60	-	20	-	80	-	100
2	Renal Dialysis Technology - Part I - Paper I Practical (UE)	-	120	-	20	-	80	100
3	Renal Dialysis Technology - Part I - Paper II Theory (UE)	60	-	20	-	80	-	100
4	Renal Dialysis Technology - Part I - Paper II Practical (UE)	-	120	-	20	-	80	100
5	Environmental Science and Community medicine - Theory (IE)	30	-	-	-	50	-	50
6.	Bio-Statistics and Research Methodology(IE)	30	-	-	-	50	-	50
7.	Basic Nutrition (Elective) / Advanced Diagnostic technique (Elective)	30	-	-	-	50	-	50

UE- UNIVERSITY EXAMINATION

IE- INTERNAL EXAMINATION

# SEMESTER – VI (RENAL DIALYSIS TECHNOLOGY)

**TOTAL HOURS: 420**

S.No	Paper	Hours/ Semester		Evaluation (Marks)				
		Lecture	Practical	Continuous Assessment (Internals)		End Semester examination (University/Department Exams)		Total
				Theory	Practical	Theory	Practical	
1.	Renal Dialysis Technology – Part II – Paper I Theory (UE)	60	-	20	-	80	-	100
2.	Renal Dialysis Technology – Part II – Paper I Practical (UE)	-	120	-	20	-	80	100
3.	Renal Dialysis Technology – Part II – Paper II Theory (UE)	60	-	20	-	80	-	100
4.	Renal Dialysis Technology – Part II – Paper II Practical (UE)	-	120	-	20	-	80	100
5.	Health Care and Basic Principles - Theory (IE)	30	-	-	-	50	-	50
6.	Hospital Management/ Applied clinical research (Elective)	30	-	-	-	50	-	50

UE- UNIVERSITY EXAMINATION

IE- INTERNAL EXAMINATION

**SEMESTER – VII (FOR ALL SPECIALITIES)**

**Project/Dissertation**

S.No	Paper	Hours / Semester		Evaluation (Marks)				Total
		Lecture	Practical	Continuous assessment (Internals)		End Semester Examination		
				Project	Viva	Project	Viva	
1.	Project/ Dissertation(UE)	-	-	100	-	100	-	200

**UE- UNIVERSITY EXAMINATION**

**SEMESTER – VII & VIII (FOR ALL SPECIALITIES)**

**Internship -12 month**



**SEMESTER - I**

<b>S.No</b>	<b>Subject</b>
1.	Anatomy – I (UE)
2.	Physiology –I (UE)
3.	Biochemistry - I(UE)
4.	Microbiology - I(UE)
5.	Pathology – I(UE)
6.	English (IE)

**SEMESTER - I**  
**ANATOMY – I (UE)**

**Objectives:**

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

- Describe the structure and functions of the organ systems of the human body.
- Describe how the organ systems function and interrelate.
- Learn basic technical terminology and language associated with anatomy.
- Develop a self-identity of what it means to be “human”.

**Learning Objectives: Skills**

- Identify the anatomical structure in the dissected specimen.
- Learn to correlate anatomical structures with relevant clinical conditions.

**CONTENTS**

**Unit I**

**Organization of the Human Body**

- Introduction to the human body
- Definition and subdivisions of anatomy
- Anatomical position and terminology
- Regions and Systems of the body
- Cavities of the body and their contents
- Levels of organization of the body

**Cell**

- Definition of a cell, shapes and sizes of cells
- Parts of a cell – cell membranes cytoplasm, sub cellular organelles and their main function
- Cell Division – Definition and main events that occur in different stages of mitosis and meiosis.

**Tissues**

- Tissues of the body
- Definition and types of basic tissues
- Characteristics, functions and locations of different types of tissues

## **Unit II**

### **Systems of Support and Movement**

#### **1. Skeletal system**

- Skeleton – Definition, axial and appendicular skeleton with names and number of bones, Types of bones. Parts of bones. Functions of bones. 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, movements possible.

#### **2. Muscular system**

- Parts of the skeletal muscle. Definition of origin and insertion. Name and location of the skeletal muscles of the body. Origin, insertion, nerve supply and action of large muscles like sternocleidomastoid, pectoralis major, deltoid, Biceps brachial, Triceps brachia, gluteus, gastronemius and diaphragm.

## **Unit III**

### **Control Systems of the Body**

#### **1. Nervous system**

- Sub-divisions of the nervous system
- **Spinal cord** – Location, extent, spinal segments, external features and internal structure.
- **Brain** – Sub-divisions, location external features of medulla oblongata, pons, mid-brain, cerebellum and cerebrum. 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** - Name, number, location and general distribution.
- **Spinal nerves** - Typical spinal nerve groups and number of spinal nerves. Name and location of cervical plexus and brachial plexus. Location and general distribution of the branches.
- **Autonomic Nervous system** –definition and functions

#### **2. Sense organs**

- Location and features of the nose, tongue, eye, ear and skin

#### **3. 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.

## **PRACTICAL & VIVA VOICE**

1. **Histology** – Epithelium
2. **Axial & Appendicular Skeleton** With Names & Number Of Bones
3. **Muscles**
  - a. Trapezius
  - b. Latissimus dorsi
  - c. Biceps
  - d. Triceps
  - e. Deltoid
4. **Nervous System**
  - a. Cerebrum
  - b. Cerebellum
  - c. Brain Stem
  - d. Spinal Cord
5. **Special Senses**
  - a. Tongue
  - b. Ear
  - c. Skin
  - d. Eye
6. **Viva Voce**
  - a. Radiology – X rays
  - b. Osteology
  - c. Charts
  - d. Models
  - e. Gluteus Muscles

### **Recommended books:**

1. Manipal manual of Anatomy for Allied Health Sciences, Sampathmadhyastha
2. B D Chaurasia: General human anatomy

### **References:**

1. B D Chaurasia: Regional Anatomy. Vol I, II,III
2. Richard S. Snell: Clinical Anatomy

# **PHYSIOLOGY-I(UE)**

## **Objectives of the course:**

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

- Comprehend basic terminologies used in the field of Human Physiology
- Define and describe basic Physiological processes governing the normal functioning of the human body.
- Apply this knowledge in their Allied Health Science practice.

## **CONTENTS**

### **Unit 1**

#### **General Physiology**

- Concept of Homeostasis
- Cell structure and functions
- Transport across membranes

#### **Nerve and muscle**

- Nerve structure, classification of nerve fibers,
- Muscles- classification , structure , Neuro-Muscular junction(NMJ).
- Muscle contraction-mechanism, types.

#### **Blood and body fluids**

- Body fluid volumes, compartments, and composition
- Blood composition and functions
- Plasma proteins
- Erythrocytes –Morphology and functions
- Leucocytes-Morphology and functions
- Platelets-Morphology and functions
- Blood groups.

### **Unit II**

#### **Digestive system**

- Salivary glands -Nerve supply, functions of saliva.
- Gastric juice-composition & functions of gastric juice.
- Pancreatic juice- composition, functions and regulation of pancreatic juice.
- Bile- composition, functions of bile and bile salts.

- Succus entericus and small intestinal movements.
- Deglutition, vomiting, functions of large intestine.

### **Excretory system**

1. Structure of Nephron and its blood supply, Juxtaglomerular Apparatus(JGA).
2. Formation of urine-Filtration, Reabsorption and secretion.
3. Counter-Current mechanism
4. Micturition.

## **PRACTICAL & VIVA VOICE**

- Microscope
- Estimation of Hemoglobin
- RBC
- WBC
- Spotters

### **Recommended book**

1. Basics of Medical Physiology (Third edition) by D. Venkatesh/ H.H. Sudhakar

### **Reference books**

1. Medical physiology for under graduates by Indhu Khurana,
2. Text Book of Physiology by A.K. Jain for BDS.

# **BIOCHEMISTRY-I (UE)**

## **Objectives:**

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

- To have a knowledge about the chemistry and metabolism of various macromolecules- carbohydrate, protein and lipids
- To learn about enzymes, vitamins, minerals and nutrition
- To know the structure and function of Hemoglobins, Nucleic acids.
- To learn about the organ function tests like Liver Function Tests and Renal Function Tests.

## **CONTENTS**

### **Unit I - CARBOHYDRATES**

- Classification of carbohydrates and their biological importance,
- Reducing property of sugars.

#### **Metabolism of Carbohydrates :**

- Digestion and Absorption of carbohydrates,
- Steps of Glycolysis and energetics,
- Steps of TCA cycle and energetics,
- Steps of Glycogen synthesis and breakdown,
- Significance of HMP shunt pathway,
- Definition and steps of Gluconeogenesis, Galactose metabolism
- Galactosemia.
- Diabetes mellitus ,

#### **Bioenergetics :**

- Importance of ATP, Outline of respiratory chain.

### **Unit II - LIPIDS**

- Classification of lipids,
- Essential fatty acids,
- Functions of cholesterol,
- Triglycerides,
- Phospholipids

#### **Metabolism of Lipids :**

- Digestion and Absorption of lipids,
- Fatty acid synthesis & Steps of  $\beta$  oxidation of fatty acids,
- Types and functions of lipoprotein,
- Lipid profile, hyper cholesterolemia

### **Unit III - VITAMINS**

#### **Vitamins:**

- Vitamins, its classification
- Vitamin A
- Vitamin D
- Vitamin E & K
- Vitamin B complex
- Vitamin C

### **Unit IV - ENZYMES**

#### **Enzymes:**

- Definition,
- Classification,
- Coenzymes,

Factors affecting enzyme activity, Types and examples of enzyme inhibition

### **PRACTICAL & VIVA VOICE**

- Reactions of Glucose
- Reactions of Fructose
- Reactions of Maltose
- Reactions of Lactose
- Tests for Sucrose
- Tests for Starch
- Identification of unknown Carbohydrates

### **SPOTTERS**

- **CRYSTALS**
  - Maltosazone
  - Lactosazone
  - Glucosazone/Fructosazone
- **REAGENTS**
  - Benedict's reagent
  - Barfoeds reagent
  - Foulgers reagent
  - Seliwanoff reagent
  - Fouchets reagent



- **CHEMICALS**
  - Sodium Acetate
  - Phenyl hydrazine
  - $\alpha$  Naphthol
- **STRUCTURES.**
  - Structure of Cholesterol
  - Structure of Glucose
  - Structure of Fructose
- **VITAMINS**
  - Carrots
  - Rickets
  - Scurvy
  - Egg

**Text books Recommended :**

- Textbook of Biochemistry for Paramedical Students By Dr.P.Ramamoorthy
- Essentials of Biochemistry by U. Sathyanarayana

**Reference books :**

- Text book of Biochemistry for Medical students by DM vasudevan, Sreekumari S, Kannan Vaidyanathan. 7<sup>th</sup> Edition
- Harper's Illustrated Biochemistry – 30<sup>th</sup> Edition.

## **MICROBIOLOGY – I (UE)**

### **OBJECTIVE:**

At the end of the semester the students should be able to

- Know the concepts of sterilization and disinfection procedures and their applications.
- Understand the basic principles of immunology.
- Understand the basic fundamental aspect of bacteria and study the common disease caused by them.

### **Contents**

#### **Unit I:**

**General Microbiology**-History and Introduction of Microbiology, Microscopy and Morphology of bacterial cell and their function, Growth and nutrition of Bacteria, Sterilization and Disinfection , Culture media, Culture methods and Identification of bacteria.

#### **Unit II:**

**Immunology**-Basic concept about Infection (Source, Portal of entry and Spread), Immunity, Antigen, Antibody, Antigen-Antibody reaction, Hypersensitivity.

#### **Unit III**

**Systemic bacteriology**- Disease caused and lab diagnosis of medically important bacteria (Staphylococcus, Streptococcus, Neisseria, Echerichia coli, Salmonella, Shigella, Vibrio, Mycobacteria, Spirochetes)

## **PRACTICAL & VIVA VOICE**

### **1. Gram staining**

### **2. Spotters:**

- Disposable syringe
- Sterile cotton swab
- Bacteriological loop
- Sterile tube
- McIntosh fildes Jar
- Autoclave
- Nutrient Agar plate
- Mac Conkey agar plate
- Mac conkey with LF

- Mac conkey with NLF
- Blood agar plate
- L J Media
- RCM
- BHI broth
- Antibiotic susceptibility test
- Gram Positive Cocci in Clusters
- Gram negative bacilli
- AFB
- VDRL Slide
- Microtitre plate

#### **RECOMMENDED BOOK:**

1. Dr.C.P.Baveja- Microbiology in Nutshell (Arya Publications).

#### **REFERENCE BOOKS:**

1. Ananthanaryanan and Paniker's - Textbook of Microbiology.
2. Subhash Chandra Parija – Textbook of Microbiology.

#### **PRACTICAL BOOK:**

1. Patwardhan,Bhat,Satish Patwardhan – Handbook of Practical examination in Microbiology

# **PATHOLOGY-I (UE)**

## **Objective:**

At the end of the semester the students should be able to

- To develop better understanding of pathological conditions and their causes.
- To develop knowledge on the diseases of major organs and structures.

## **Contents**

### **Unit-I. Introduction to cell**

- Normal Cell Structure Function

### **Unit-II. Cell injury and Adaptation**

- Causes and Types of Cell Injury
- Cellular Adaptations- (Hypertrophy, Hyperplasia, Atrophy, Metaplasia)
- Necrosis-Definition, Causes, Types with Examples, Morphology
- Apoptosis-Definition, Causes, Morphology
- Pathological Calcification

### **Unit-III. Inflammation and Repair**

- Inflammation-Definition, Types, Cardinal signs
- Acute Inflammation-Vascular events and Cellular events( ONLY NAMES) , Outcomes of Acute inflammation, Morphological types of Acute inflammation( ONLY NAMES), Chemical Mediators(ONLY NAMES)
- Chronic Inflammation- Causes and Granulomatous inflammation
- Wound Healing and Repair- Definition, Steps in wound healing, Factor influencing wound healing, Complications of wound healing( ONLY NAMES)

### **Unit-IV. Hemodynamic Disorder**

- Edema- Definition, Causes and Pathogenesis
- Thrombosis-Definition, Causes and Fate of thrombus
- Embolism-Definition and Types
- Infarction-Definition and Classification
- Shock-Definition, Stages, Types of Shock, Etiopathogenesis of Septic shock

### **Unit-V. Infectious Disease**

- Tuberculosis-Etiology, predisposing factors, primary & secondary tuberculosis and complications
- Leprosy-Etiology, classification, Lepromatous and tuberculoid leprosy

## **Unit-VI.Neoplasia**

- Definition, Nomenclature & Classification
- Characteristics of Benign and Malignant neoplasms,
- Pathogenesis of Cancer(Only Names of Carcinogenic agents)
- Spread of Cancer(Metastasis and Pathways of spread)

## **Unit-VII.Genetics**

- Down syndrome
- Klinefelter syndrome
- Turner syndrome

## **Unit-VIII. Radiation**

- Effects of Radiation

## **PRACTICAL & VIVA VOICE**

### **• DIFFERENTIAL COUNT**

- Spotter

### **• GROSS (SPOTTER)**

- Fatty liver
- Lipoma
- Dry gangrene foot
- Wet gangrene bowel
- CVC Spleen
- Hydatid cyst
- TB – Lung

### **• INSTRUMENTS**

- Westergrens ESR tube
- Sahli hemocytometer
- Neubaur's chamber
- Bone Marrow Needle

### **Recommended Textbook:**

1. Textbook of Pathology ,Harsh Mohan,3<sup>rd</sup> edition

### **Reference book:**

1. Harsh Mohan,3<sup>rd</sup> edition – Text book of Pathology
2. Dr. Ramdas Nayak, Publisher: Jaypee - Text book of Pathology

## **ENGLISH (IE)**

### **General objectives:**

At the end of the semester the students should be able to

- To improve comprehensive and writing skills in English
- To discuss about effective communication skills
- To prevent barriers in communication.

### **Unit I: Grammar**

- Components of a sentence
- Positive and Negative statements
- Interrogative Statement
- Parts of speech in brief
- Transformation and synthesis of sentences
- Verb and Tense forms
- Voice
- Reported Speech
- Common errors and how to avoid them

### **Unit II. Vocabulary**

- Medical Terminology
- Words often confused or misused
- Words and expression in British and American English
- Idioms and Phrases

### **Unit III. Oral communication**

- Importance of speaking efficiently
- Voice culture
- Preparation of Speech
- Secrets of good delivery
- Audience Psychology
- Presentation Skills
- Using non-verbal communication
- Interview technique
- Skill in arguing

### **Unit IV. Spoken English**

- The phonetic symbols
- Stress
- Intonation
- Rhythm
- Transcription
- Using dictionaries for learning to pronounce

## **Unit V. Written communication**

### **(a) Art of writing**

- Rules for effective writing
- Expansion of proverbs & Ideas
- Précis writing

### **(b) Letter writing**

- Private letters & Social letters
- Business letters
- Letter to a Bank
- Letter to a Newspaper
- Letter to Application
- Curriculum Vitae (Different models)
- Placing an order

### **(c) Report writing**

- Guidelines to prepare a good report
- Usage of impersonal language
- Preparing lab reports

### **(d) Note making and Note taking**

- Note making and note taking strategies
- Organizing notes
- Exercise and note making / taking

### **(e) Comprehension**

- Listening and reading comprehension  
(Exercise of prescribed short answers)

## **Unit VI. Reading**

- What is efficient and fast reading?
- Awareness of existing reading habits
- Tested techniques for improving speed
- Improving concentration and comprehension through systematic study.

### **Reference Books:**

1. English for Competitive Examinations by R.P.Bhatnagar, Rajiel Bhargava
2. English for college and competitive exams by Dyvadatham
3. Written Communication in English by Sarah Freeman
4. Writing with a purpose by Tickoo & Sasikumar
5. English phonetics for Beginners by P.Iyadurai
7. Empowerment through verbs & idioms by Padmini devkumar
8. High School English Grammar and Composition by Wren & Martin
9. Communication techniques for your success everywhere by Muralidharan.

## **SEMESTER-II**

<b>S.No:</b>	<b>Subject</b>
1.	Anatomy – II (UE)
2.	Physiology –II (UE)
3.	Biochemistry – II(UE)
4	Microbiology – II(UE)
5.	Pathology – II(UE)
6.	Pharmacology(UE)
7.	Physics(IE)
8.	Computer science (IE)



## **SEMESTER II**

### **ANATOMY – II (UE)**

#### **Objectives:**

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

- Describe the structure and functions of the organ systems of the human body.
- Describe how the organ systems function and interrelate.
- Learn basic technical terminology and language associated with anatomy.
- Develop a self-identity of what it means to be “human”.

#### **Unit I**

##### **Maintenance of the Human Body**

###### **a) 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 of the heart.
- Blood supply of the heart. The systemic arteries and veins. Name, location, branches and main-distribution of principal arteries and veins.

###### **b) Lymphatic system**

- Lymph, lymphatic vessels, name, location and features of the lymphatic organs.

###### **c) Respiratory system**

- Names of organs of respiration, Location and features of nose, pharynx, larynx, trachea, bronchi, lungs and pleura.

#### **Unit II**

###### **a) Digestive system**

- Names of organs of digestion. Parts of alimentary canal and accessory organs. Location and features of mouth, pharynx, esophagus, stomach, small and large intestines. Location and features of salivary glands, pancreas, liver and gall bladder.

###### **b) Urinary system**

- Names of urinary organs, location and features of kidney, ureter, urinary bladder and urethra.

#### **Unit III**

###### **a) Reproductive system**

- 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 and its supports, uterine tube, ovary vagina vulva and breast.

**b) Anatomical Regions**

- Simple ideas about scalp, triangles of neck, axilla, cubital fossa, mediastinum, inguinal canal, femoral triangle, popliteal fossa.

**PRACTICAL & VIVA VOICE SYLLABUS**

- **Endocrine System**

- Pituitary gland
- Pineal body
- Thyroid & parathyroid gland
- Adrenal
- Pancreas
- Gonads – Ovary & Testis

- **Cardio-Vascular System**

- Heart

- **Lymphatic system**

- Spleen

- **Respiratory System**

- Lungs
- Larynx
- Trachea

- **Digestive System**

- Salivary glands
- Esophagus
- Pharynx
- Stomach
- Liver, Gall bladder
- Duodenum
- Small intestine
- Large intestine

- **Urinary system**
  - Kidneys
  - Ureter
  - Urinary bladder
- **Reproductive System**
  - Sagittal section – Male & Female pelvis
  - Uterus & ligaments
  - Ovary
  - Prostate
  - Seminal vesicles
  - Vas deferens
  - Testis
- **Viva Voce**
  - Radiology – Xrays
  - Osteology
  - Charts
  - Models

**Recommended books:**

1. Manipal manual of Anatomy for Allied Health Sciences, Sampathmadhyastha.
2. B D Chaurasia: General human anatomy.

**References:**

1. B D Chaurasia: Regional Anatomy. Vol I, II,III.
2. Richard S. Snell: Clinica

## **PHYSIOLOGY-II (UE)**

### **Objectives:**

- To develop vocabulary for appropriate terminologies to effectively communicate terms related to physiology of various body systems
- To identify and describe physiological functions of various structures involved in smooth functioning of the body.

### **Unit I Cardiovascular System**

- Cardiac muscle, action potential and conducting system of the heart.
- Cardiac cycle.
- ECG, heart sounds, Heart Rate.
- Cardiac output-Definition, factors regulating cardiac output and measurement of cardiac output.
- Blood pressure-Definition, measurement, factors maintaining BP.
- Regional circulation-Coronary and cerebral.

### **Unit -II Nervous system**

- Structure & Properties of Neuron.
- Nerve- Classification, injury.
- Types and properties of Receptors
- Synapse and synaptic transmission.
- Reflex and its properties.
- Spinal cord-Ascending & Descending tracts.
- Thalamus, Basal ganglia, Cerebellum, Cerebral cortex, Hypothalamus & Cerebrospinal fluid.
- Autonomic nervous system.
- Ascending and descending tracts.

### **Unit -III Respiratory system**

- Structure of upper and lower respiratory tract. Muscles of respiration and Mechanism of respiration.
- Lung volumes and capacities-definition, normal values, intrapulmonary and intra pleural pressures, surfactant.
- Oxygen transport, carbon-dioxide transport.
- Neural and chemical regulation of respiration.
- Hypoxia, cyanosis, Artificial Respiration.

#### **Unit – IV Special sense and skin**

- Vision,
- Audition,
- Olfaction,
- Gustation.

#### **Unit – V Reproductive system**

- Male reproductive organs-Spermatogenesis and testosterone actions.
- Female reproductive organs.
- Contraception Methods.

#### **Unit – VI Endocrine system**

- Hypothalamus hypophyseal inter relationship.
- Anterior pituitary hormones and their functions.
- Posterior pituitary hormones and their actions.
- Thyroid hormones, biosynthesis and functions.
- Parathyroid hormones ,functions.
- Insulin, glucagons, actions and Diabetes mellitus.
- Adrenal cortex hormones and their functions.
- Adrenal medullary hormones and their actions

#### **PRACTICAL & VIVA VOICE SYLLABUS**

1. WBC.
2. Blood pressure.
3. Bleeding time
4. Clotting time.
5. Charts and spotters.

#### **Recommended book**

- Basics of Medical Physiology (Third edition) by D. Venkatesh/ H.H. Sudhakar

#### **Reference books**

- Medical physiology for under graduates by Indhu Khurana,
- Text Book of Physiology by A.K. Jain for BDS.

## **BIOCHEMISTRY – II (UE)**

### **Objectives:**

At the end of the semester the students should be able

- To have a knowledge about the chemistry and metabolism of proteins
- To learn about nutrition-balanced diet and malnutrition
- To know the structure and function of Hemoglobins, Nucleic acids.
- To learn about the organ function tests like Liver Function Tests and Renal Function Tests.

### **Unit I - PROTEINS**

#### **Proteins :**

- Classification of amino acids,
- Structure of proteins,
- Plasma proteins,
- Immunoglobulins.

#### **Metabolism of Proteins :**

- Digestion and absorption of proteins,
- Transamination,
- Deamination,
- Steps of urea cycle,
- Phenyl ketonuria,
- Alkaptonuria,
- Transmethylation,
- Products derived from Glycine and tyrosine

### **Unit II -- NUCLEIC ACIDS**

#### **Nucleic acids:**

- Structure & Function of DNA,
- Structure, Its types & Functions of RNA
- Nucleic Acid Metabolism

### **Unit III - HAEMOGLOBIN**

#### **Haemoglobin:**

- Structure & Function of Haemoglobin
- Haemoglobin Metabolism

## **Unit IV-- MINERALS**

### **Minerals:**

- Macro & Minor Minerals & Metabolism

## **Unit V -- NUTRITION**

### **Nutrition:**

- BMR, SDA & Glycemic Index
- Dietary Fibers & Balanced Diet
- Protein Energy Malnutrition

## **Unit VI -- ORGAN FUNCTION TEST**

- RFT

## **Unit XI - ACID BASE BALANCE**

### **Acid Base Balance:**

- pH Homeostasis
- Buffers
- Buffers
- Acidosis
- Alkalosis

## **PRACTICAL & VIVA VOICE**

- Non- Protein Nitrogenous Substances
- Analysis Constituents of normal urine
- Analysis Constituents of abnormal urine
- Identification of abnormal constituents in urine
- Estimation of Glucose in blood
- Estimation of Urea in blood.

### **Spotters**

**Spotters:** The student must identify the spotter and write some important uses of the spotter.

1. Urinometer
2. Lactometer
3. Centrifuge

4. Spectroscope
5. Colorimeter
6. pH meter
7. Ryles' Tube
8. Chromatography apparatus
9. Electrophoresis apparatus
10. Micropipette
11. Fluorosis
12. Inborn Errors of Metabolism
13. Protein Energy Malnutrition
14. Benzidine powder
15. Sulphur powder
16. Fouchet's Reagent
17. Structure of t RNA
18. Egg White
19. Jaundice
20. Gout

**Text books Recommended:**

- Textbook of Biochemistry for Paramedical Students By Dr.P.Ramamoorthy
- Essentials of Biochemistry by U. Sathyanarayana

**Reference books:**

- Text book of Biochemistry for Medical students by DM vasudevan, Sreekumari S, Kannan Vaidyanathan. 7<sup>th</sup> Edition
- Harper's Illustrated Biochemistry – 30<sup>th</sup> Edition.



## **MICROBIOLOGY – II (UE)**

### **OBJECTIVE:**

At the end of the semester the students should be able to

- Explain general and specific mechanisms by which an infectious agent like viruses, fungi and parasites causing diseases.
- Explain interventions employed to prevent infectious diseases including infection control measures and vaccines.

### **Unit-I**

**Virology:** Introduction to virology, List of medically important viruses and diseases (AIDS, Hepatitis, Rabies, Polio) and Lab diagnosis of viral infections

### **Unit - II**

**Mycology:** Introduction to Mycology, List of medically important fungi and diseases (Candidiasis, Cryptococcosis, Dermatophytes, Aspergillosis and Mucor mycosis) and Lab diagnosis of fungal infections.

### **Unit - III**

**Parasitology:** Introduction to Parasitology, List of medically important parasites and diseases (E.histolytica, Plasmodium, W.bancrofti, Ascaris, Ancylostoma) and Lab diagnosis of parasitic infections

### **Unit - IV**

**Applied Microbiology-**Collection and transport of clinical specimen, Sexually transmitted disease, Hospital acquired infection, Urinary tract infection, Skin and Soft tissue infection, Anaerobic infection, Respiratory tract infection and Bloodstream infection, Immunoprophylaxis, Biomedical Waste Management and standard precautions.

## **PRACTICAL & VIVA VOICE**

### **I.SPOTTERS**

1. Ascaris lumbricoides
2. Taenia
3. Gram stained smears showing Candida
4. Universal container
5. Vaccine-OPV
6. BCG

7. Hepatitis
8. DPT
9. TT
10. MMR
11. Virology –Embryonated egg
12. Tissue culture
13. Rhabdovirus
14. Polio virus
15. HIV

## **II. Clinical case discussion with charts**

1. Skin and soft tissue infections
2. Ring worm/ Tinea infections
3. Food poisoning
4. Gastroenteritis

## **RECOMMENDED BOOK:**

1. Dr.C.P.Baveja- Microbiology in Nutshell (Arya Publications).

## **REFERENCE BOOKS:**

1. Ananthanaryanan and Paniker's - Textbook of Microbiology.
2. Dr.C.P.Baveja – Textbook of Microbiology.

## **PRACTICAL BOOK:**

1. Patwardhan, Bhat, SatishPatwardhan – Handbook of Practical examination in Microbiology.

## **PATHOLOGY- II (UE)**

### **UNIT-1: CARDIOVASCULAR SYSTEM**

- Ischemic Heart Disease
- Myocardial Infarction-Definition, Etiopathogenesis and Morphology
- Valvular Heart Disease
- Rheumatic Heart Disease- Definition, Etiopathogenesis and Morphology
- Infective Endocarditis- Definition , Etiopathogenesis and Morphology
- Congenital Heart Diseases- Only Names
- Hypertension- Definition, causes, Morphology and Complications
- Atherosclerosis- Definition, Etiopathogenesis, Morphology and Complications

### **UNIT-2: RESPIRATORY SYSTEM**

- Pneumonia- Definition, Etiopathogenesis and Morphology
- COPD-(Emphysema, Chronic Bronchitis, Bronchial Asthma) - Definition, Etiopathogenesis and Morphology
- Bronchiectasis- Definition, Etiopathogenesis and Morphology

### **UNIT-3: GASTROINTESTINAL SYSTEM**

- Gastritis and Peptic ulcer disease- Definition, Etiopathogenesis, Morphology and Complications
- Tumors of GIT
- Gastric carcinoma-Etiology and Morphology

### **UNIT-4: HEPATOBILIARY SYSTEM**

- Liver Abscess
- Amoebic liver abscess
- Alcoholic Liver Disease and Liver Cirrhosis- Definition, Etiopathogenesis , Morphology and Complications, Jaundice- Definition, Pathophysiology, Types and Causes
- Viral Hepatitis- Definition, Etiology and Morphology
- Cholecystitis

### **UNIT-5: RENAL AND URINARY SYSTEM**

- Renal Calculus- Etiology, Types and Complications
- UTI and Pyelonephritis – Causes, Etiopathogenesis , Morphology and Complications
- Renal Cell Carcinoma- Causes and Names of Tumors
- Renal Failure

- Acute Glomerulonephritis/Nephritic syndrome and Nephrotic syndrome- Definition, Causes, Clinical Presentation and Complications

#### **UNIT-6: REPRODUCTIVE SYSTEM**

- Diseases of Testis, Uterus, Cervix, Ovary- Only Names

#### **UNIT-7: CENTRAL NERVOUS SYSTEM**

- Infection
- Meningitis- Definition, Causes and CSF Findings

#### **UNIT-8: DISEASES OF BONES & JOINTS**

- Septic Arthritis
- Osteomyelitis-Definition, Causes, Morphology and Complications
- Rheumatoid Arthritis- Definition, Etiopathogenesis and Morphology
- Bone Tumors- Only Names

#### **UNIT-9: ANEMIA**

- Anemia- Definition, Classification
- Iron deficiency and Megaloblastic Anemia- Etiology and Morphology

#### **UNIT-10: AUTOIMMUNE DISEASES**

- Definition and Names of common autoimmune diseases

### **PRACTICAL & VIVA VOICE**

#### **INSTRUMENT TEST**

- RBC Pipette
- WBC Pipette
- Sahli's Pipette
- Wintrobe's PCV tube
- Hb Estimation
- Blood grouping

#### **SPECIMEN**

- Chronic Pyelonephritis
- RCC
- SCC – Foot
- Leiomyoma – Fibroid uterus
- Gall stones
- Appendicitis
- Liver abscess

**Recommended Textbook:**

1. Textbook of Pathology ,Harsh Mohan,3<sup>rd</sup> edition

**Reference book:**

1. Harsh Mohan,3<sup>rd</sup> edition – Text book of Pathology
2. Dr. Ramddas Nayak, Publisher: Jaypee - Text book of Pathology  
Dr.Ramddas Nayak, Publisher: Jaypee – Text book of Pathology and Genetics

# **PHARMACOLOGY (UE)**

## **COURSE OBJECTIVES:**

- To understand the terminologies and basic principles of pharmacokinetic and pharmacodynamic involved in the use of drugs.
- To understand the pharmacological action and mechanism of action of common drugs used for different disease conditions.
- To know the therapeutic uses and adverse effects of common drugs used for different disease conditions

### **Unit I: Introduction**

- General pharmacological principles-Definition-Routes of drug administration-Pharmacokinetics-
- Pharmacodynamics-Adverse drug effects
- Drugs acting on Autonomic Nervous System, Peripheral Nervous System and Drugs acting on Central Nervous system

### **Unit II**

- General considerations-Cholinergic system & drugs-Anticholinergic drugs-Adrenergic drugs-antiadrenergic drugs-Drugs acting on autonomic ganglia.

### **Unit III:**

- Skeletal muscle relaxants-Local anaesthetics,General anaesthetics-Ethyl & Methyl alcohol-Sedatives-Hypnotics-Antiepileptics-Antiparkinsonian drugs-Drugs used in mental illness-Opioid analgesics and Non opioid Analgesics-Nonsteroidal Antiinflammatory drugs

### **Unit IV**

- Cardiovascular drugs , Drugs affecting Blood & Blood formation and Drugs on Respiratory system
- Cardiac glycosides,Antiarrhythmic drugs, Antianginal drugs,Antihypertensives and Diuretics,Haematinics,Erythropoietin,,Drugs affecting-coagulation,Fibrinolytic and Antiplatelet drugs,Treatment of cough and antiasthmatic drugs.

## Unit V

- Antimicrobial drugs
- General consideration-Antibiotics-Antibacterial agents-Antitubercular drugs-Antifungal-Antileprotic-Antiviral-Antimalarial-Antiamoebic-Antiprotozoal drugs-Cancer Chemotherapy, Antiseptic-Disinfectant-others.

## Unit VI

- Hormones & related Drugs, Drugs used in Gastrointestinal diseases & Miscellaneous drugs
- Corticosteroids, Antithyroid drugs and Drugs for Diabetes Mellitus, Treatment of Vomiting, Constipation, Diarrhoea and Treatment of peptic ulcer
- Vitamins, Vaccines, Sera and chelating agents.

### Recommended books:

1. Prep Manual for Undergraduates in Pharmacology by Tara V Shanbag, 2<sup>nd</sup> edition
2. Pharmacology for Dental and Allied Health Sciences by Padmaja Udaykumar, 3<sup>rd</sup> edition

### Reference books:

1. Essentials of Medical Pharmacology by KD Tripathi, 7<sup>th</sup> edition
2. Basic and Clinical Pharmacology by Bertram G Katzung, 12<sup>th</sup> edition

## **PRACTICAL & VIVA VOICE**

### Learning Objective

This module is intended to discuss the various modalities of drug delivery and instruments relevant to it.

- Instruments
- Needles
  - Intravenous
  - Intrathecal
  - Spinal
  - Intra arterial
- Syringes:
  - Tuberculin
  - Insulin
  - I.V cannula
  - Scalp. Vein set

- Students Discussion
  - Enema can
  - Inhalers
  - Spacers
  - Nebulizers
- Tablets –
  - Enteric coated,
  - Sustained release,
  - Sub-lingual
- Students Discussion
  - Capsules
  - Spansules
  - Pessary
  - Suppository
  - Topical Preparation
  - Ointment,
  - Lotion,
  - Powder,
  - Drops – eye / ear
- Charts:
  - Mechanism of action of drugs, adverse effects, toxicology
- Spotters:
  - drugs

**Text books suggested for reading:**

- Text book of pharmacology for Dental & Allied Health Science 2nd edition Padmaja Udaykumar
- Pharmacology for dental students Tara V shanbhag, Smita Shenoy, Veena Nayak
- Principles of pharmacology 2nd edition H.L.Sharma & KK Sharma



## **PHYSICS (IE)**

### **Unit 1: Basic concepts**

Basic Units, Heat, Acoustics etc. Basic concepts of power, work, force, energy Einstein's formula Electronics, Electricity & Magnetism, electromagnetic waves Units and measurements temperature and heat SI units of above parameters Atomic structure Nucleus Atomic Number, Mass Number electron orbit and energy levels Periodic table Isotopes Isobars Ionization and excitation Radioactivity, Natural and artificial radioactivity alpha decay beta decay.

### **Unit 2: Electromagnetic induction**

Electric charges electric induction electric potential capacitance and capacitors. Electrical energy and power unit of current resistance and Ohm's law circuit laws heating effect of current sources of electrical energy E.M.F. Magnetism, Magnetic effect of an electric current application of magnetic field. Electromagnetic induction, laws of mutual induction and self-induction. Alternating current transformers theory and losses practical aspects reactance –resonance impedance and power factors.

### **Unit 3: Laser**

Nature of light-Reflection-Refraction-Total internal reflection- Optical fibers- Applications in Medicine - Laser-Principles-Action-Types of laser, Basic principles of laser in Medical application - Argon-Iron laser photo coagulator-Photo thermal-Photochemical application -Applications of laser in Medicine- Laser hazards and safety measures.

### **Unit 4: Radiation Physics**

Introduction to nuclear physics and radioactivity, Radioactive radiations - X-ray, production of x-ray, Properties of x-ray radiations - Biological effects of radiation, Radiation damage in matter, Radiation protection principles, radiation detection and measurement - Ultrasound and generation of ultrasound.

### **Unit 5: Introduction to Imaging Technique**

Principles of Microscope: Simple microscope and compound microscope - Radiography: Making an X-ray image –Fluoroscopy-. CT Scans, MRI - Ultrasonography: Ultrasound picture of Body-A-Scan-B-Scan-M-Scan-Ultrasound diathermy-Phonocardiography - Radio isotopes: Uses of radio isotopes -<sup>99m</sup>Tc Generator-Scintillation detectors - Application of scintillation detectors - Gamma Camera - Positron Camera.

### **Unit 6: Semiconductor devices**

Principles of diodes and Transistors – Integrated circuits – Amplifiers – Basic configuration and types – differential and operational amplifiers– Waveform generators – Timer – A/D and D/A converters – Active filters – Transducers – Basic configuration and types.

## **Unit 7: Biopotential Recording Systems**

Introduction to bioelectric potential – Electrodes and surfaces – Biopotential amplifier – Frequency ranges of various Bio potential signals – Working principles of bio potential recording systems – Electrocardiography – Electroencephalography – Electromyography.

### **Recommended books:**

1. New Understanding physics for advanced level-JimBreithaupt.
2. Advanced Physics for you by Keith Johnson, Simmon shewett, Sueholt,Johnmiller
3. Christensen's Physics of diagnostic Radiology by Thaomas S.CurryIII, M.D., Robert C Murry, Jr. PhD., Dow Dey, PhD.
4. Applied Electronics, A. Subramanyam, The National Publishing co., Madras(1996).

## **Computer Science (IE)**

### **Unit-I. History of computers,**

- Definition of computers, Input devices, Output devices, Storage devices, Types of memory and units of measurement, Range of computers, Generations of computers, Characteristics of computers

### **Unit-II. System:**

- Hardware, Software, system definition, Fundamentals of Networking, Internet, Performing searches and working with search engines, types of software and its applications

### **Unit-III. Office application suite**

- Word processor, spreadsheet, presentations, other utility tools, Fundamentals of Linux / Windows operating system, functions, interfaces, basic commands, working with the shell and other standard utilities.

### **Unit-IV. Language**

- Comparison chart of conventional language, Programming Languages, Generations Of Programming Languages, Compilers and Interpreters, Universal programming constructs based on SDLC, Variable, constant, identifiers, functions, procedures, if while, do – while, for and other Structures. Programming in C language, Data types, identifiers, functions and its types, arrays, union, structures and pointers

### **Unit-V. Introduction to object oriented programming with C++:**

- Classes, Objects, Inheritance Polymorphism and Encapsulation. Introduction to databases, and query languages, Introduction to Bioinformatics.

### **Practicals:**

1. Various browsers, search engines, email
2. Text document with images with multiple formatting options using a specified office package
3. Spreadsheet using a specified office package
4. Presentation on a specified topic using the specified locations
5. Shell programming-parameters
6. Shell program- regular expressions
7. C program- functions
8. C program – file handling
9. C program demonstrating the usage of user defined variables

10. Databases

11.Applications in allied health sciences

**Text Books:**

1. Peter Norton., Introduction to Computers. 7th Edition, Tata McGraw Hill Education Private Limited 2010.
2. Gary B. Shelly, Thomas J. Cashman, Misty E. Vermaat., Microsoft Office 2007. 1stEdition, Delmar Cengage Learning 2010

**Reference Books:**

1. C programming tutorial (K&R version 4) Author(s) Mark Burgess
2. Red hat Linux 9 bible by Christopher Negus May 2003

### **SEMESTER III**

<b>S.NO</b>	<b>SUBJECT</b>
1	Applied Anatomy and Physiology related to Renal Dialysis Technology-Theory(UE)
2	Applied Anatomy and Physiology related to Renal Dialysis Technology - Practical(UE)
3	Applied Pharmacologyrelated to Renal Dialysis Technology -Theory(UE)
4	Applied Pharmacologyrelated to Renal Dialysis Technology -Practical(UE)
5	Medical Ethics and Biosafety (IE)
6	Psychology(IE)

## **SEMESTER – III**

### **APPLIED ANATOMY AND PHYSIOLOGY**

#### **RELATED TO RENAL DIALYSIS TECHNOLOGY – THEORY (UE)**

##### **Course Objective :**

An Outline of Renal Anatomy and Physiology will be provided to improve the students understanding of Technical and Diagnostic procedures used with Special emphasis on Applied aspects.

##### **Objective :**

To develop in depth knowledge on Anatomy and Physiology of Renal system.

#### **Contents**

##### **Unit- I**

##### **Gross structures of Excretory system :**

- Structure of kidney
- Structure of Ureter
- Structure of Urinary Bladder
- Structure of Nephron
- Embryology of Kidney
- Histology of Kidney

##### **Unit- II**

##### **Vascular supply of Excretory system :**

- Renal artery & Renal vein
- Jugular vein
- Subclavian vein
- Femoral vein
- Artery & Veins used for creation of AV Fistula
- Innervations of Kidney and Urinary Bladder
- Peritoneum in general

##### **Unit- III**

##### **Physiology related to Dialysis technology – Mechanism of Urine formation**

- Filtration
- Reabsorption

- Concentration
- Dilution
- Acidification

#### **Unit- IV**

##### **Functions of Excretory system :**

- Excretory and Regulatory functions
- Metabolic and Endocrine functions
- Physiology of Micturition, Types of Bladder dysfunction
- Renal function Test

#### **Unit- V**

##### **Regulatory functions of Excretory system :**

- Role of Kidney in Blood Pressure regulation in health and diseases
- Mechanism of Blood formation and regulation
- Role of Kidney in Bone formation
- Role of Kidney in Acid – Base balance
- Other Endocrine functions of the Kidney
- Body fluids and Electrolytes & their regulation in health and diseases
- Disorders of Water Metabolism (Potassium, Sodium, Phosphate, Calcium)
- Role of Peritoneum in Peritoneal Dialysis

##### **Recommended Books :**

1. Anatomy and Physiology in Health and Illness – Ross and Wilson, 12<sup>th</sup> Edition, Elsevier Health Sciences, 2014.
2. Fundamentals of Medical Physiology - L.Prakasam Reddy, 5<sup>th</sup> Edition, Paras Medical Publishers, 2013.
3. Essentials of Medical Physiology – K.Sembulingam, Premasembulingam, 6<sup>th</sup> Edition, Jaypee.

##### **Reference Books :**

1. Human Anatomy – B D Chaurasia, 6<sup>th</sup> Edition, CBS, 2013.
2. Text Book of Medical Physiology – Guyton and Hall, 12<sup>th</sup> Edition, Saunders, 2010.
3. The Kidney – Brenner and Rector's, 9<sup>th</sup> Edition, Elsevier Health Sciences, 2012.

**Specific Learning Outcomes (SLO) :**

- Will be able to explain the Anatomy of Renal system with better knowledge on terminologies.
- Will be able to explain to Physiological processes with understanding.
- Will be able to provide better support during a Renal disorder with knowledge of Anatomy and Physiology.



**APPLIED ANATOMY AND PHYSIOLOGY**  
**RELATED TO RENAL DIALYSIS TECHNOLOGY – PRACTICAL (UE)**

**Objective :**

1. To inculcate thorough knowledge on the Anatomy of various organs and structures related to Renal system.
2. To elaborate on various Physiological processes related to Renal system.

**Contents**

**Gross Specimens / Spotters :**

1. Kidney
2. Ureter
3. Urinary Bladder

**Charts :**

1. Renal corpuscle
2. Glomerular apparatus
3. Nephron ((Renal corpuscle, Proximal tubule, Loop of Henle, Distal tubule and Collecting tubule)
4. Renal artery & Renal vein, Jugular vein, Subclavian vein, Femoral vein, Radial artery, Cephalic vein
5. Innervations of Kidney and Urinary Bladder
6. Peritoneum in general
7. Functions of Excretory system (Excretory, Regulatory, Metabolic and Endocrine functions)
8. Physiology of Micturition, Types of Bladder dysfunction
9. Renal function Tests
10. Physiology of Micturition
11. Types of Bladder dysfunction
12. Mechanism of Urine formation
13. Role of Kidney in Blood Pressure regulation in health and diseases
14. Mechanism of Blood formation and regulation
15. Role of Kidney in Bone formation

16. Role of Kidney in Acid – Base balance
17. Other Endocrine functions of the Kidney
18. Body fluids and Electrolytes & their regulation in health and diseases
19. Disorders of Water Metabolism (Potassium, Sodium, Phosphate, Calcium)
20. Role of Peritoneum in Peritoneal Dialysis

**Specific Learning Outcomes (SLO) :**

- Will be able to express anatomical terminologies with clarity.
- Will be able to recognize improper physiological functions.
- Will be able to show competency in handling patients with renal disorders with knowledge on Applied Anatomy and Physiology.

## **APPLIED PHARMACOLOGY**

### **RELATED TO RENAL DIALYSIS TECHNOLOGY – THEORY (UE)**

#### **Course Objective :**

The Course will cover General Pharmacology with Special Emphasis on common drugs used, Route of Administration, Type of formulations, Dose and frequency of administration, Side effects and Toxicity, Management of Toxic effects, Drug interactions, Knowledge of chemical and trade names, Importance of Manufacturing and expiry dates and instruction about handling each drug.

#### **Objective :**

1. To develop understanding of various drugs and their Pharmacokinetics in relation to Renal System.
2. To introduce the Importance of Pharmacology in Dialysis Emergencies.

### **Contents**

#### **Unit- I**

##### **Common Drugs used in Renal Medicine - I**

- Diuretics
- Antihypertensives
- Antibiotics
- Steroids
- Vitamin-D analogues, Phosphate binders
- Immunosuppressive medications used in Renal Transplantation

#### **Unit- II**

##### **Common Drugs used in Renal Medicine - II**

- IV Fluids in Renal patient
- Iron therapy in Dialysis
- Erythropoietin
- Chemicals used in Dialysis unit
- Hemodialysis Concentrates
- Peritoneal Dialysis Fluids
- Potassium exchange resins
- Replacement Fluids used for CRRT

- Vaccines used in Dialysis patients – Hepatitis B

### **Unit- III**

#### **Drugs affecting Coagulation :**

- Heparin including Low Molecular Weight heparin
- Warfarin
- Protamine Sulphate
- Regional Citrate Anticoagulation

#### **Drugs preventing Coagulation :**

- Antiplatelet drugs
- Thrombolytic agents

### **Unit- IV**

#### **Cardiovascular drugs & Inotropic Drugs :**

- Digoxin
- Beta – blockers
- Dopamine
- Dobutamine
- Adrenaline
- Isoprenaline

#### **Vasodilators :**

- Nitroglycerine
- Nitroprusside

### **Unit- V**

#### **Other drugs :**

- Antihistamine
- Lipid Lowering agents
- Dialysable drugs
- Bicarbonate
- Potassium
- Magnesium

**Recommended Books :**

1. Pharmacology for Dental and Allied Health Sciences - PadmajaUdaykumar, 3<sup>rd</sup> Edition, CBS, 2012.
2. Essentials of Medical Pharmacology – K D Tripathi, 7<sup>th</sup> Edition, Jaypee Brothers Medical Publishers, 2013.

**Reference Books :**

1. Pharmacology - Richard A.Harvey, 4<sup>th</sup> Edition, Saunders, 2009.
2. Pharmacology and Pharmacotherapeutics - R S Sataskar, 21<sup>st</sup> Edition, Popular Prakashan Ltd, 2015.

**Specific Learning Outcome (SLO) :**

- Will be able to explain various drug mechanisms, Route of Administration, Type of formulations, dose, Frequency of administration, side effects and toxicity.
- Will be able to recognize drug actions in their regimes in relation to Renal system conditions.
- Will be able to identify and support Physicians in diagnosis and treatment of renal disease conditions with competency.

## **APPLIED PHARMACOLOGY**

### **RELATED TO RENAL DIALYSIS TECHNOLOGY – PRACTICAL (UE)**

#### **Objective :**

1. To cover General Pharmacology with Special Emphasis on common drugs used, Route of Administration, Type of formulations, Dose and frequency of administration, Side effects and Toxicity, Management of Toxic effects, Drug interactions.
2. To impart knowledge of chemical and trade names, importance of manufacturing, expiry dates and instruction about handling each drug.

#### **Contents**

#### **Spotters And Charts :**

1. Diuretics
2. Antihypertensives
3. Antibiotics
4. Steroids
5. IV Fluids in Renal patient
6. Iron therapy in Dialysis
7. Vitamin-D analogues, Phosphate binders
8. Erythropoiesis Stimulating Agents
9. Chemicals used in Dialysis unit including composition and mechanism of action
10. Hemodialysis Concentrates
11. Peritoneal Dialysis Fluids
12. Replacement Fluids used for CRRT
13. Chemicals used for Sterilization including Formaldehyde, Hydrogen Peroxide, Sodium Hypochlorite, Citrostere, Renalin and its mechanism of action
14. Vaccines used in Dialysis patients – Hepatitis B
15. Immunosuppressive medications used in Renal Transplantation
16. Heparin including Low Molecular Weight heparin
17. Warfarin
18. Protamine Sulphate
19. Regional Citrate Anticoagulation
20. Antiplatelet drugs
21. Thrombolytic agents
22. Cardiovascular drugs (Digoxin, Betablockers, Dobutamine, Adrenaline, Isoprenaline)
23. Antihistamine
24. Lipid Lowering agents
25. Dialysable drugs
26. Bicarbonate
27. Potassium
28. Magnesium
29. Vasodilators (Nitro-glycerine, Nitroprusside)

**Specific Learning Outcome (SLO) :**

- Will be able to explain on various drug mechanisms.
- Will be able to recognize drug actions in their regimes in relation to disorders to Renal system.
- Will be able to identifying and supporting physicians in diagnosis and treatment of renal pathological conditions with competency.

## **MEDICAL ETHICS AND BIOSAFETY (IE)**

### **UNIT-I**

Definition and key Concepts; philosophical considerations; epistemology of science; ethical terms; principles and theories; relevance to health care; ethics and the law issues: genetic engineering, stem cells, cloning, medical techniques, trans-humanism, bio-weapons.

### **UNIT-II**

Define negligence, malpractice & liability; iatrogenic harm; Influence of ethics in general practice; Describe primary and secondary ethical principles; Hippocrates' oath; Professional codes of ethics; Describe the moral basis of informed consent and advance directives; research ethics – animal rights, ethics of human cloning, and stem cell research; ICMR guidelines.

### **UNIT-III**

Genetic testing, genetic screening, Fertility and birth control, sex determination and sex selection, Reproductive control: assisted reproduction and ethics, pre-natal genetic counseling, pre-implantation genetic diagnosis, Ethical issues in applied medicine; Workers compensation.

### **UNIT-IV**

Euthanasia and physician-assisted dying; end-of-life care; Physicians, patients and other: autonomy, truth telling & confidentiality; emerging issues: impact of medical advances on society; Use of genetic evidence in civil and criminal court cases; Challenges to public policy – to regulate or not to regulate; improving public understanding to correct misconceptions.

### **UNIT-V**

Introduction to Biosafety; biological safety cabinets; containment of biohazard; precautions for medical workers; precautions in patient care; Biosafety levels of microorganisms; mitigation of antibiotic resistance; radiological safety; measurement of radiation; guidelines for limiting radiation exposure; maximum reasonable dose; precautions against contamination; Institutional Biosafety committee.



# **PSYCHOLOGY(IE)**

## **UNIT 1: Basic Concepts of Psychology**

Definition of Psychology, Origin of Psychology - Philosophical roots of psychology, Schools of Psychology –Structuralism – Gestalt – Functionalism – Behaviorism - Psychoanalysis – Humanistic. Fields of Psychology - Work of a psychologist – Applications of psychology.

## **UNIT 2: Learning principles and methods**

Definition of learning, Factors In The Process of Learning Classical conditioning - Operant Conditioning – The principle of reinforcement and Punishment. Theory of learning.Cognitive learning- Latent learning, Insight learning, and Imitation.

## **UNIT 3: Motivation, Emotion, Memory and forgetting**

Motivation - Definition of motivation – Theories of motivation - Physiological basis of motivation – Motivational factors in aggression – Self-actualization motivation. Emotion – Emotional expression – Theories of emotions. Kinds of remembering – Retrieval processes – The nature of forgetting – Two process theories of memory – Improving memory –Language and thought – Symbols and concepts – Structure – Forms of thought - Thinking and reasoning – Concept formation.

## **UNIT 4: Development, Sensory Processes and Perception.**

Erikson's stages of psychosocial development Lawrence Kohlberg's stages of moral development Freud's Stages of Psychosexual Development Physiological basis of behavior – The brain and nervous system –The sensory process , Some general characteristic of senses – Five senses ,Perception: Organization – The role of learning in perception – Perception and attention – Perceptual process.

## **UNIT 5: Intelligence & Personality**

Theories of intelligence – Measuring Intelligence – Kinds of intelligence tests – Ability – Formation of aptitude and attitude – Aptitude tests –Creativity and its tests. Personality – Definition of Personality – Theories of Personality – Assessment of Personality.Social Factors Influencing Personality.

## **UNIT 6: Social Psychology**

Definition, Nature, Subject Matter and Scope Of Social Psychology-Applications and Importance of Social Psychology, Groups: Definition and Type- Primary And Secondary Groups Social Interaction, Social and Inter-Personal Relations. Inter-personal attraction – Love and Companionship.Prosocial-behavior. Modes of empathy: self – other differentiation and development of empathy. Social influence: attitude and conformity. Definition - Characteristics and Classification of Crowd. Leadership: Definition and characteristics, Defense

Mechanisms, frustration and conflict, sources of frustration and conflict, types of conflicts. Aggression and Types of aggression.

### **UNIT 7: Health Psychology**

Definition of Health Psychology -Relating Health Psychology to other fields Clinical Health Psychology, Public Health Psychology, Community Health Psychology, Critical Health Psychology

Abnormal Psychology: Concepts of normality and abnormality, causation of mental illness, neuroses, psychoses, psychosomatic disorders, measures to promote mental health.

Stress - Definitions- Models of Stress – Theories of Stress - Stress reactions – Coping and Stress Management techniques, Pain and its management - Psychological reactions of a patient to loss – Stages of Acceptance by Kubler-Ross.

### **REFERENCES:**

1. Clifford T. Morgan, Richard a. King, John R. Weis and John Schopler, **“Introduction to Psychology” – 7th Edition**. Tata McGraw Hill Book Co. New Delhi, 1993.
2. Baron, R. A., & Byrne, D (2006), **“Social psychology”**, New Delhi: Prentice hall of India private limited.
3. Elliot Aronson, Timothy D. Wilson, Robin M. Akert, Samuel R. Sommers, **“Social psychology” 9<sup>th</sup> edition** published by Pearson education, Inc., 2006
4. Shelley E. Taylor. **“Health Psychology” Third Edition**. McGraw Hill International Editions, 1995.
5. Swaminathan, V.D, Latha Sathish, **“Psychology for Effective Living”**, Department of Psychology, University of Madras.
6. Coleman, James. 1980. **“Abnormal Psychology and modern life”**. New Delhi: Tata McGraw Hill Ltd.

### **SEMESTER IV**

<b>S.NO</b>	<b>SUBJECT</b>
1	Concepts of disease and outlines of clinical evaluation related to Renal Dialysis Technology Paper - I Theory (UE)
2	Concepts of disease and outlines of clinical evaluation related to Renal Dialysis Technology Paper - I Practical (UE)
3	Concepts of disease and outlines of clinical evaluation related to Renal Dialysis Technology Paper - II Theory (UE)
4	Concepts of disease and outlines of clinical evaluation related to Renal Dialysis Technology Paper - II Practical (UE)
5	Basics and Advanced Life Support - Theory (IE)
6	Sociology - Theory (IE)

## **SEMESTER – IV**

### **CONCEPTS OF DISEASE AND OUTLINES OF CLINICAL EVALUATION RELATED TO RENAL DIALYSIS TECHNOLOGY - PAPER I - THEORY (UE)**

#### **Course Objective :**

An outline of concepts of various Kidney Diseases will be provided to improve the students in-depth understanding of the causes, pathophysiology, diagnosis and management used with special emphasis on applied aspects and also assists in disease diagnosis, based on observed changes in tissue structure or biochemistry, while the focus of investigative pathology is the elucidation of the underlying mechanisms related to tissue injury and disease processes. The Goal of the course will be to expand and extend the student's knowledge of normal structure and function into the realm of disease processes.

#### **Objective :**

- 1.To inculcate knowledge on various pathological conditions.
- 2.To elaborate on Renal diseases and disorders and their diagnosis and therapeutic techniques.

### **Contents**

#### **Unit- I**

##### **Basic Renal Disorders :**

- Glomerular Diseases– causes, types & pathology  
Definition, etiology, pathophysiology of each type, medical and surgical management
- Post Infectious Glomerulonephritis
- Acute Renal Failure  
Definition, etiology, pathophysiology of each type, medical and surgical management
- Chronic Renal Failure – Chronic Kidney Disease (CKD)  
Definition, etiology, pathophysiology of each type, medical and surgical management

#### **Unit- II**

##### **Acid – Base, fluids and Electrolyte Disorders :**

- Metabolic Acidosis, Metabolic Alkalosis & Respiratory Acidosis, Respiratory Alkalosis
- Disorders Of Sodium
- Disorders Of Potassium Metabolism
- Disorders Of Calcium And Phosphorus Homeostasis
- Edema and The Clinical Use Of Diuretics

#### **Unit- III**

##### **The Kidney in Systemic diseases :**

- Renal function in Congestive heart failure
- Renal function in Liver diseases
- Renal involvement in Systemic vasculitis
- Renal manifestations in SLE and other Rheumatic disorders

## **Unit- IV**

### **Diabetic Nephropathy :**

- Epidemiology
- Pathogenesis
- Diagnosis
- Management
- Prevention

## **Unit- V**

### **Renal Biopsy :**

- Indications
- Contraindications
- Procedure
- Pre and Post biopsy care

### **Recommended Books :**

1. Basic Pathology - Robbins, 9<sup>th</sup> Edition, Saunders, 2012.
2. Primer on Kidney diseases - Greenberg, 5<sup>th</sup> Edition, Elsevier Health Sciences, 2009.

### **Reference Books :**

1. Textbook of Pathology – Harsh Mohan, 7<sup>th</sup> Edition, Jaypee Brothers Medical Publishers, 2014.
2. Kidney Diseases in Primary Care – K.Mandal and Stanley, 3<sup>rd</sup> Edition, Dorrance Publishing Co, 2008.
3. Davidson’s Principle and Practice of Medicine – Brain R Walker, 22<sup>nd</sup> Edition, Churchill Livingstone, 2014.
4. ABC of Kidney Diseases – David Goldsmith, 22<sup>nd</sup> Edition, BMJ books, 2011.

### **Specific Learning Outcome (SLO) :**

- Will be able to identify the pathological processes in relation to Renal disorders.
- Will be able to demonstrate the competency in handling patients with Renal disorders.
- Will be able to express support in diagnosing and treatment of Kidney disease patients with care

## **CONCEPTS OF DISEASE AND OUTLINES OF CLINICAL EVALUATION RELATED TO RENAL DIALYSIS TECHNOLOGY - PAPER I - PRACTICAL (UE)**

### **Objective :**

1. To inculcate knowledge on various pathological conditions.
2. To elaborate on Renal diseases and disorders and their diagnosis and therapeutic techniques.

### **Contents**

#### **Specimens and Charts / Case Discussions :**

1. Glomerular Diseases
2. Post Infectious Glomerulonephritis
3. Acute Renal Failure
4. Chronic Renal Failure – Chronic Kidney Disease (CKD)
5. Acid – Base, fluids and Electrolyte Disorders
6. Renal function in Congestive heart failure
7. Renal function in Liver diseases
8. Renal involvement in Systemic vasculitis
9. Renal manifestations in SLE and other Rheumatic disorders
10. Diabetic Nephropathy
11. Renal Biopsy

#### **Urine Analysis :**

1. Physical Examination
2. Chemical Examination
3. Microscopic Examination

#### **Specific Learning Outcome (SLO) :**

- Will be able to identify the pathological processes in relation to Renal sciences.
- Will be able to demonstrate the competency in handling patients with Renal disorders.
- Will be able to express support in diagnosing and treatment of Kidney disease patients with care.

# CONCEPTS OF DISEASE AND OUTLINES OF CLINICAL EVALUATION RELATED TO RENAL DIALYSIS TECHNOLOGY - PAPER II - THEORY (UE)

## Course Objective :

An outline of concepts of various Kidney Diseases will be provided to improve the students in-depth understanding of the causes, pathophysiology, diagnosis and management used with special emphasis on applied aspects and also assists in disease diagnosis, based on observed changes in tissue structure or biochemistry, while the focus of investigative pathology is the elucidation of the underlying mechanisms related to tissue injury and disease processes. The Goal of the course will be to expand and extend the student's knowledge of normal structure and function into the realm of disease processes.

## Objective :

- 1.To inculcate knowledge on various pathological conditions.
- 2.To elaborate on Renal diseases and disorders and their diagnostic techniques.

## Contents

### Unit- I

#### The Kidney in Systemic disease :

- Amyloidosis
- Hyperoxaluria
- HemolyticUremic Syndrome / Thrombotic Thrombocytopenic Purpura
- Hereditary Renal disorders
- Kidney disorders in Pregnancy

### Unit- II

#### Obstructive Renal Disorders :

- Obstructive Uropathy
- VesicoUreteric Reflux and Reflux Nephropathy
- Nephrolithiasis

### Unit- III

#### Infectious Diseases :

- Renal diseases associated with HIV infection
- Urinary Tract Infection (UTI)

### Unit- IV

#### Drugs and The Kidney :

- Analgesics and The Kidney
- Principles of Drug therapy in Kidney failure

## **Unit- V**

### **Renal Hypertension :**

- Pathogenesis
- Essential HTN
- Renovascular HTN
- Therapy of HTN

### **Recommended Books :**

1. Basic Pathology - Robbins, 9<sup>th</sup> Edition, Saunders, 2012.
2. Primer on Kidney diseases - Greenberg, 5<sup>th</sup> Edition, Elsevier Health Sciences, 2009.

### **Reference Books :**

1. Textbook of Pathology – Harsh Mohan, 7<sup>th</sup> Edition, Jaypee Brothers Medical Publishers, 2014.
2. Kidney Diseases in Primary Care – K.Mandal and Stanley, 3<sup>rd</sup> Edition, Dorrance Publishing Co, 2008.
3. Davidson’s Principle and Practice of Medicine – Brain R Walker, 22<sup>nd</sup> Edition, Churchill Livingstone, 2014.
4. ABC of Kidney Diseases – David Goldsmith, 22<sup>nd</sup> Edition, BMJ books, 2011.

### **Specific Learning Outcome (SLO) :**

- Will be able to identify the pathological processes in relation to Renal disorders.
- Will be able to demonstrate the competency in handling patients with Renal disorders.
- Will be able to express support in diagnosing and treatment of Kidney disease patients with care.



## CONCEPTS OF DISEASE AND OUTLINES OF CLINICAL EVALUATION RELATED TO RENAL DIALYSIS TECHNOLOGY - PAPER II - PRACTICAL (UE)

### **Objective :**

- 1.To inculcate knowledge on various pathological conditions.
2. To elaborate on Renal diseases and disorders and their diagnosis and therapeutic techniques.

### **Contents**

#### **Charts / Spotters / Specimens :**

1. Amyloidosis
2. Hyperoxaluria
3. HUS / TTP
4. Hereditary Renal disorders
5. Kidney disorders in Pregnancy
6. Obstructive Uropathy
7. VUR and Reflux Nephropathy
8. Nephrolithiasis
9. Renal diseases associated with HIV infection
10. Urinary Tract Infection (UTI)
11. Drugs and The Kidney
12. Renal Hypertension

#### **Specific Learning Outcome (SLO) :**

- Will be able to identify the pathological processes in relation to Renal sciences.
- Will be able to demonstrate the competency in handling patients with Renal disorders.
- Will be able to express support in diagnosing and treatment of Kidney disease patients with care.

## **BASIC AND ADVANCED LIFE SUPPORT (IE)**

- BLS
- TRIAGE
- Primary survey
- Secondary survey
- Airway & Ventilatory management
- Shock
- Central & peripheral venous access
- Thoracic trauma – Tension pneumothorax
- Other thoracic injuries
- Abdominal trauma – Blunt injuries
- Abdominal trauma – Penetrating injuries
- Spine and spinal cord trauma
- Head trauma
- Musculoskeletal trauma
- Electrical injuries
- Thermal burns
- Cold injury
- Pediatric trauma
- Trauma in pregnant women
- Workshop BLS
- Workshop cervical spine immobilization
- Imaging studies in trauma
- The universal algorithm for adult ECC
- Ventricular fibrillation/Pulseless ventricular tachycardia algorithm
- Pulseless electrical activity (PEA) / asystole algorithm
- Bradycardia treatment algorithm
- Tachycardia Treatment algorithm
- Hypotension / Shock
- Acute myocardial infarction
- Pediatrics Advanced life support
- Defibrillation
- Drugs used in ACLS
- Emergency cardiac pacing
- AED
- Techniques for oxygenation and ventilation

# **SOCIOLOGY(IE)**

## **UNIT 1: NATURE AND SCOPE OF SOCIOLOGY**

Definition, Historical background, subject matter of sociology, Nature and scope, Importance, Sociology of India, Relationship of sociology with other social sciences

## **UNIT 2: FUNDAMENTAL CONCEPTS OF SOCIOLOGY**

Society and Individual, Community, Social structure and functions of Institutions, Association, Organization, Social system, social order, Social control, social groups, Social Process, Social change,

## **UNIT 3: CLASSICAL THINKERS AND THEIR CONTRIBUTIONS**

Auguste Comte, Emile Durkheim, Karl Marx, Max Weber, Herbert Spencer

## **UNIT 4: SOCIOLOGY OF INDIA**

Characteristics of Indian society, Racial linguistic, Religious and demographic, Hindu social organization-ashramas, varnas, dharma and karma, purushartha, Caste system, Problems of SC&ST, Sanskritisation, Westernization and Modernization,

## **UNIT 5: ANTHROPOLOGY AND CULTURAL ANTHROPOLOGY**

Definition of anthropology, Subfield of anthropology, Cultural Anthropology yesterday and today, Anthropological Perspectives, Early Anthropologist

Environment and culture, Kinship, Clan Ethno methodology, Gender, Subsistence and Exchange, Social Organization and evolution of political system.

### **Reference:**

1. Bottomore.T.B., Sociology: A guide to problems and Literature,1971,Random House
2. Gisbert P. Fundamentals of sociology,3rd Edition,2004,Orient Longman publications
3. Neil J.Smelser,Handbook of sociology,1988.sage publication
4. Johnson R.M,Systematic Introduction to Sociology,1960,Allied Publishers
5. Cultural Anthropology,Barbara D.Miller,2006 Pearson/Allyn and Bacon Co
6. C.N.ShankarRao., Introduction to Sociology, 2008, S.CHAND & Company Publications.
- 7..C.N.ShankarRao., Sociology of India, S.CHAND & Company Publications

## **SEMESTER V**

<b>S.NO</b>	<b>SUBJECT</b>
1.	Renal Dialysis Technology - Part I - Paper I -Theory (UE)
2.	Renal Dialysis Technology - Part I - Paper I - Practical (UE)
3.	Renal Dialysis Technology - Part I - Paper II - Theory (UE)
4.	Renal Dialysis Technology - Part I - Paper II - Practical (UE)
5.	Environmental Science and Community medicine - Theory (IE)
6.	Bio-Statistics and Research Methodology(IE)
7.	Basic Nutrition (Elective) / Advanced Diagnostic technique (Elective) (IE)

## **SEMESTER – V**

### **RENAL DIALYSIS TECHNOLOGY PART I - PAPER I – THEORY (UE)**

#### **Objective :**

- 1.To understand the Principles of Dialysis and Skills necessary to give safe and effective care during Haemodialysis treatments.
- 2.To understand Operation, Routine maintenance, Identification of Malfunction and Trouble shooting in Dialysis Equipment.

#### **Contents**

##### **Unit- I**

- Dialysis Team (Doctors, Technologist, Nurses, Technician, Renal Dietician – Rights, Responsibilities and Relationship with Patients)
- History of Haemodialysis
- Principles of Haemodialysis
- Indications for Dialysis
- Types of Haemodialysis

##### **Unit – II**

##### **Dialyzer**

- Dialyzer membranes – Types & biocompatibility
- Types of Dialyzers  
Introduction to dialyzer, types, uses and sizes of the various membranes, structure, characteristics.
- High Flux and High Efficiency Dialyzers  
Definition of high flux / high efficiency dialysis, molecular weight cut off, ultrafiltration coefficient (Kuf), mass transfer coefficient (KoA), clearance (K)], Bio-compatibility, differences between high flux dialysis and hemodialysis, uses and indications for high flux dialysis, complications of high flux dialysis, precautions and contraindications, care during a high flux dialysis
- Dialyzer reprocessing and reuse of dialyzers  
History of dialyzer reprocessing, reason for dialysis reprocessing, steps involved in dialyzer reprocessing, hazards of dialyzer reprocessing, documentation for dialyzer reprocessing.

##### **Unit- III**

##### **Water Treatment :**

- Purpose of Water Treatment
- Filtration, Softener and Carbon Filtration
- Deioniser
- RO system
- Ultrafiltration

## **Unit- IV**

### **Vascular Access :**

- History , Types of Access
- Access care
- Access complications & Management
- Vascular Access Recirculation
- Cannulation techniques

## **Unit- V**

### **Haemodialysis apparatus:**

- Composition of Dialysate
- Components and Functions of HD Equipment's
- Machine monitoring during Haemodialysis.
- Anticoagulation
- Haemodialysis Adequacy

### **Recommended Books :**

1. Handbook of Dialysis – J.T.Daugirdas, 5<sup>th</sup> Edition, Lippincott Williams & Wilkins, 2014.
2. Dialysis Therapy – Allen R.Nissenson, Richard N.Fine, 4<sup>th</sup> Edition, Hanley &Belfus, 2007.

### **Reference Books :**

1. Dialysis History, Development and Promise – ToodS.Ing, 1<sup>st</sup> Edition, World Scientific Publishing Company, 2011.
2. Principles and Practice of Dialysis – William L.Henrich, 4<sup>th</sup> Edition, Lippincott Williams & Wilkins, 2009.
3. Basic Clinical Dialysis – David Harris, 1<sup>st</sup> Edition, McGraw – Hill Book Company Australia, 2008.

### **Specific Learning Outcome (SLO) :**

- To prepare Accomplished Professionals in Dialysis Technology with a specific emphasis on Clinical Skills, Technical Knowledge that will enable Trainee to function as an independent Dialysis Professional.
- To acquire the knowledge and procedural skills necessary to deliver High Standard of Care to the Patients with Chronic Kidney Disease requiring Renal Replacement Therapy.

## **RENAL DIALYSIS TECHNOLOGY PART I - PAPER I – PRACTICAL (UE)**

### **Objective :**

1. To understand the Principles of Dialysis and Skills necessary to give safe and effective care during Haemodialysis treatments.
2. To understand Operation, Routine maintenance, Identification of Malfunction and Trouble shooting in Dialysis Equipment.

### **Contents**

#### **Charts / Slides / Spotters**

1. Dialysis Team (Doctors, Technologist, Nurses, Technician, Renal Dietician – Rights, Responsibilities and Relationship with Patients)
2. Basic chemistry of Body fluids and Electrolytes
3. History, Principles and Indications of Haemodialysis
4. Types of Haemodialysis
5. Water Treatment System
6. Dialyser Membranes – Types and Biocompatibility
7. Types of Dialysers
8. Haemodialysis Adequacy
9. Anticoagulation
10. Composition of Dialysate

## RENAL DIALYSIS TECHNOLOGY PART I - PAPER II – THEORY (UE)

### Objective :

1. To be able to assess the patient for any complications with an understanding of the problem and recognize the need to report the complications to the Physician or Nephrologist.
2. To respond effectively to the Physical and Emotional needs of the patient undergoing Dialysis treatment.

### Contents

#### Unit- I

- Prevention of Renal Disease
  - Staging and causes of chronic kidney disease
  - Early diagnosis of CKD
  - Counselling on adequate control of diabetes and hypertension,
  - Methods to control the progression of CKD
  - Avoiding nephrotoxic drugs
  - Community counselling and awareness about kidney disease
  - Importance of annual master healthcheckups after 40 years of age
  - Diet and medication counseling for CKD patients
  - Early diagnosis and management of complications of CKD (anemia, malnutrition, mineral bone disease), Preparing a patient before ESRD (e.g. early creation of AV fistula etc.)
- Basic chemistry of Body fluids and Electrolytes
- Lab data analysis
  - Tests done for a patient on Hemodialysis, interpretation of tests and normal values.
- Patient Assessment– General, Pre, Intra and Post dialysis

#### Unit- II

- Acute complications during Haemodialysis.
- Chronic complications during Haemodialysis
- Sodium profiling and ultrafiltration profiling

#### Unit- III

- Haemodialysis in Infants and Children
- Psychosocial Aspects of Dialysis
- Infection Control and Universal Precautions

#### Unit- IV

- Special procedures – Slow Continuous Therapies
- Plasmapheresis
- Hemoperfusion
- MARS



## **Unit- V**

- Drugs & dialysis
- Quality assurance in Dialysis
- Current Research in Haemodialysis

ISO RO water standard for hemodialysis, Wearable Artificial Kidney, Novel markers of AKI, Online Hemodiafiltration, Online Hemofiltration, Online Hemodialysis, Extracorporeal Therapies in Special Situations.

### **Recommended Books :**

1. Handbook of Dialysis – J.T.Daugirdas, 5<sup>th</sup> Edition, Lippincott Williams & Wilkins, 2014.
2. Dialysis Therapy – Allen R.Nissenson, Richard N.Fine, 4<sup>th</sup> Edition, Hanley &Belfus, 2007.

### **Reference Books :**

1. Dialysis History, Development and Promise – ToodS.Ing, 1<sup>st</sup> Edition, World Scientific Publishing Company, 2011.
2. Principles and Practice of Dialysis – William L.Henrich, 4<sup>th</sup> Edition, Lippincott Williams & Wilkins, 2009.
3. Basic Clinical Dialysis – David Harris, 1<sup>st</sup> Edition, McGraw – Hill Book Company Australia, 2008.

### **Specific Learning Outcome (SLO) :**

- Able to assess and evaluate associated patient and machine complication during Dialysis.
- Able to write reports, make referrals (medical, educational) and counsel the patient.
- Able to handle different types of HD machines.
- Able to calibrate of Haemodialysis machines.

## **RENAL DIALYSIS TECHNOLOGY PART I - PAPER II – PRACTICAL (UE)**

### **Objective :**

1. To be able to assess the patient for any complications with an understanding of the problem and recognize the need to report the complications to the Physician or Nephrologist.
2. To respond effectively to the Physical and Emotional needs of the patient undergoing Dialysis treatment.

### **Contents**

#### **Charts / Slides / Spotters / Case study :**

1. Quality assurance in Dialysis
2. High Flux and High Efficiency Dialysis
3. Haemodialysis in Infants and Childrens
4. Acute complications in Haemodialysis patients
5. CRRT (Continuous Renal Replacement Therapy)
6. Plasmapheresis
7. Hemoperfusion
8. MARS
9. Psychosocial Aspects of Dialysis
10. Infection Control and Universal Precautions
11. Current Research in Haemodialysis

#### **Specific Learning Outcome (SLO) :**

- Able to assess and evaluate associated patient and machine complication during Dialysis.
- Able to write reports, make referrals (medical, educational) and counsel the patient.
- Able to handle different types of HD machines.
- Able to calibrate of Haemodialysis machines.

## **ENVIRONMENTAL SCIENCE AND COMMUNITY MEDICINE (IE)**

**Natural Resources:** Introduction, Multi-disciplinary nature of environmental studies, Earth Resources and Man, Renewable And Non-Renewable Resources, Water Resources, Mineral Resources: Food Resources: Effects of modern agriculture, Fertilizer/ pesticide problems, Waterlogging, and salinity, Energy Resources.

**Ecosystems:** Concept of an Ecosystem, Structure And Functions of an Ecosystem, Producers, Consumers and Decomposers, Cycles in The Ecosystem

**Pollution:** Definition, Causes, Effects and Control Measures of Air Pollution, Water Pollution, Pollution, Marine Pollution, Noise Pollution, Thermal Pollution, Nuclear hazards, Solid Waste Management role of Individuals in Pollution Prevention.

**Social Issues Human, Population and Environment:** From Unsustainable To Sustainable Development, Urban Problems Related To Energy, Water Conservation, Rain Water Harvesting, global warming, acid rain, ozone layer depletion, nuclear accidents and nuclear holocaust.

**Concept of health & disease:** Concept of health, Definition of health, Philosophy of health - Dimension of health - Concept of well being, Spectrum of health, Responsibility of health - Determinates of health & Indicators of health - Concepts of disease & Concepts of cessation – Natural history of disease – Iceberg phenomenon - concept of control - concept of prevention - Modes of Intervention, Changing pattern of disease.

**Epidemiology:** Definition & Explanation, Aims, Epidemiologic approach, Basic measurement in epidemiology & tools of measurement – of Mortality , Epidemiologic methods – Descriptive epidemiology – Analytical epidemiology - Cohort study – Experimental epidemiology – RCT - Association & Causation Uses of epidemiology (Criteria for judging causality) – Infection disease epidemiology Definitions Dynamic of disease transmission & Mode of Transmission – Disinfection – Definitions Types Agents used Recommended disinfection procedures – Investigation of an epidemic.

**Environmental & health:** Definition & Components (environment sanitation environmental sanitation)

Water : Safe & Whole some water Requirements Uses source of water supply (sanitary well ) –

Purification (1). Large scale purification, (2). Small scale purification – Water quality – Special treatment of water Air: Composition the air of occupied room discomfort.

Air pollution & its effects. Prevention & Control of air pollution

Ventilation : Definition Standards of ventilation Types of Ventilation. Light, Noise & Radiation,

Meteorological environment, Housing, Disposal of waste Excreta disposal

## **INTRODUCTION**

What is statistics – Importance of statistics in behavioral sciences – Descriptive statistics and inferential statistics – Usefulness of quantification in behavioral sciences. Measurements – Scales of measurements – Nominal, Ordinal, Interval and Ratio scales. Cumulative frequency curve – Drawing inference from graph. Measures of central tendency – Need – types: Mean, Median, Mode – Working out these measures with illustrations. Measures of variability – Need – Types: Range, Quartile deviation, Average deviation, Standard deviation, Variance – Interpretation. Normal distribution – General properties of normal distribution – Theory of probability – Illustration of normal distribution – area under the normal probability curve. Variants from the normal distribution – skewness – Quantitative measurement of skewness – kurtosis – measurement of kurtosis – factors contributing for non-normal distribution.

## **RESEARCH METHODS:**

Research Meaning- Scope and Objectives –.Research methods vs. Methodology. Types of research – Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical, concept of applied and basic research process, criteria of good research. Defining and formulating the research problem, selecting the problem, necessity of defining the problem, importance of literature review in defining a problem, literature review-primary and secondary sources, reviews, monograph, patents, research databases, web as a source, searching the web, critical literature review, identifying gap areas from literature and research database, development of working hypothesis

## **DATA COLLECTION AND SAMPLING:**

Data collection – Classification of data – Class intervals – Continuous and discrete measurements – Drawing frequency polygon – types of frequency polygon – Histogram. Accepts of method validation, observation and collection of data, methods of data collection, sampling methods, data processing and analysis strategies and tools, data analysis with statically package (Sigma STAT, SPSS for student t-test, ANOVA, etc.), hypothesis testing. Correlation – historical contribution – meaning of correlation – types: Product, moment, content correlation, variation of product, movement correlation, rank correlation, Regression analysis. Tests of significance- need for – significance of the mean – sampling error – significance of differences between means – interpretation of probability levels – small samples – large samples.

## **BASIC NUTRITION (ELECTIVE) (IE)**

### **UNIT 1 - NUTRITIONAL ASSESSMENT**

- Nutritional anthropometric measurements
- Nutritional biochemical assessment
- Clinical signs & symptoms
- Dietary assessment

### **UNIT 2 - NUTRITION THROUGH LIFE CYCLE**

- Diet during infancy
- Diet during preschool
- Diet during school
- Diet during adolescence
- Diet during adulthood
- Diet during geriatrics
- Diet during special needs- Pregnancy and lactation

### **UNIT 3 - THERAPEUTIC NUTRITION 1**

- Dietary management in underweight,
- Dietary management in obesity,
- Dietary management in diabetes,
- Dietary management in hypertension.

### **UNIT 4 - THERAPEUTIC NUTRITION 2**

- Dietary management in cardiovascular diseases
- Dietary management in renal diseases
- Dietary management in cancer

## **ADVANCED DIAGNOSTIC TECHNIQUES (ELECTIVE) (IE)**

### **Unit I**

Volumetric analysis, Balancing & Weighing, Concept of solute & solvent, Units of measurement. Specimen Collection & Processing: Specimen collection (Blood, urine, spinal fluid, saliva synovial fluid, Amniotic fluid), Preservation, transportation

### **Unit II**

Clinical Enzymology: Principle of diagnostic enzymology, Digestive enzyme, miscellaneous enzyme. General Function Tests: Liver function test, Cardiac Function Test, Renal Function Test, Thyroid Function test, Reproductive endocrine function test

### **Unit III**

Immunodiagnosics: Introduction, Antigen-Antibody Reactions, Conjugation Techniques, Antibody Production, Enzymes and Signal Amplification Systems, Separation and Solid-Phase Systems, Studies related to bacterial, viral and parasitic infections.

### **Unit IV**

Product Development: Immunoassay Classification and Commercial Technologies, Assay Development, Evaluation, and Validation, Reagent Formulations and Shelf Life Evaluation, Data Analysis, Documentation, Registration, and Diagnostics Start-Ups.

### **Unit V**

DNA based diagnostics: PCR, RFLP, SSCP, Microarrays, FISH, In-situ hybridization, Studies related to bacterial, viral and parasitic infections, Cell based diagnostics: Antibody markers, CD Markers, FACS, HLA typing, Bioassays.

## **SEMESTER VI**

<b>S.NO</b>	<b>SUBJECT</b>
1.	Renal Dialysis Technology – Part II – Paper I Theory (UE)
2.	Renal Dialysis Technology – Part II – Paper I Practical (UE)
3.	Renal Dialysis Technology – Part II – Paper II Theory (UE)
4.	Renal Dialysis Technology – Part II – Paper II Practical (UE)
5.	Health Care and Basic Principles (IE)
6.	Hospital Management/ Applied clinical research (Elective) (IE)



## **SEMESTER – VI**

### **RENAL DIALYSIS TECHNOLOGY PART II - PAPER I – THEORY (UE)**

#### **Objective :**

1. To understand the management of patients requiring Peritoneal Dialysis and technical aspects of Dialysis related equipment.
2. To contribute to a new generation of academic dialysis professional equipped to address the challenging problems in Renal Replacement Therapy.

#### **Contents**

##### **Unit- I**

##### **Introduction to Peritoneal Dialysis :**

- History of Peritoneal Dialysis
- Physiology of PD – Kinetics of PD
- Acute Peritoneal Dialysis
- Indications and Contraindications for Chronic PD

##### **Unit- II**

##### **PD Apparatus :**

- Solutions
- Transfer set
- Connectologies
- Access for CAPD
- Catheter and Exit site care

##### **Unit- III**

##### **PD Process & Therapies :**

- PD Therapies – Intermittent & Continuous
- Assessment of Peritoneal membrane permeability
- Adequacy of Peritoneal Dialysis

##### **Unit- IV**

##### **PD Complications & Management :**

- Infectious complications of PD
- Non-infectious complications of PD – Mechanical and Metabolic
- Patient education guidelines

## **Unit- V**

### **Transplantation and Current Research :**

- Types of Renal Donor
- Cadaver Donor maintenance – Brain death
- Recipient and Donor workup for Renal Transplantation
- Principles of Post-transplant management and followup
- Transplantation rejection & complication.
- Human organ transplant act

### **Recommended Books :**

1. Handbook of Dialysis – J.T.Daugirdas, 5<sup>th</sup> Edition, Lippincott Williams & Wilkins, 2014.
2. Handbook of Kidney Transplantation – Gabriel M.Danovitch, 5<sup>th</sup> Edition, Lippincott Williams & Wilkins, 2009.

### **Reference Books :**

1. Nolph and Gokals Textbook of Peritoneal Dialysis – Ramesh Khanna, 3<sup>rd</sup> Edition, MartinusNijhoff Publishers, 2009.
2. Kidney transplantation – Sir Peter J.Morris, 6<sup>th</sup> Edition, Saunders, 2014.
3. Medical Complications of Kidney Transplantation – Claudio Ponticelli, 1<sup>st</sup> Edition, CRC Press, 2005.

### **Specific Learning Outcome (SLO) :**

- Able to independently train the patients on Home Peritoneal Dialysis.
- Able to assess and evaluate the patient waiting for Renal Transplant and Donor.
- Have the skill to administer required protocols and interpret the clinical findings with reference to the patients.
- Have the skills to take part in organising Cadaver Transplant.

## **RENAL DIALYSIS TECHNOLOGY PART II - PAPER I – PRACTICAL (UE)**

### **Objective :**

1. To understand the management of patients requiring Peritoneal Dialysis and technical aspects of Dialysis related equipment.
2. To contribute to a new generation of academic dialysis professional equipped to address the challenging problems in Renal Replacement Therapy.

### **Contents**

#### **Charts / Slides / Spotters / Case study :**

1. History of Peritoneal Dialysis
2. Physiology of PD – Kinetics of PD
3. Acute Peritoneal Dialysis
4. PD Solutions
5. Transfer set
6. Adequacy of Peritoneal Dialysis
7. Non-infectious complications of PD – Mechanical and Metabolic
8. Infectious complications of PD
9. Patient education
10. Types of Renal Donor & Cadaver Donor maintenance
11. Recipient and Donor workup for Renal Transplantation
12. Principles of Post-transplant management and followup

#### **Specific Learning Outcome (SLO) :**

- Able to independently train the patients on Home Peritoneal Dialysis.
- Able to assess and evaluate the patient waiting for Renal Transplant and Donor.
- Have the skill to administer required protocols and interpret the clinical findings with reference to the patients.
- Have the skills to take part in organising Cadaver Transplant.

## **RENAL DIALYSIS TECHNOLOGY PART II - PAPER II – THEORY (UE)**

### **Objective :**

1. To understand and apply the Principles of Dialysis and skills necessary to give safe and effective care to the individual undergoing Dialysis Therapy.
2. To assess the patient for any long term complications with an understanding of the problem and recognize the need to report the complications to the Physician or Nephrologist.

### **Contents**

#### **Unit- I**

##### **Systemic diseases in Dialysis Patients :**

- Nutrition in Dialysis Patients  
Introduction to nutrition and RDA's. Renal diet. Teaching for a patient on renal diet. Foods to avoid, method of cooking to be employed. Planning a renal diet for a patient with chronic kidney disease. Screening for under nutrition among dialysis patients.
- Diabetes in Dialysis Patients
- Hypertension in Dialysis Patients
- Serum enzyme levels
- Haematological abnormalities

#### **Unit- II**

##### **Systemic and Infectious diseases in Dialysis Patients :**

- Infections in Dialysis Patients
- Endocrine disturbances
- Bone disease
- Aluminium toxicity
- Sleep disorders

#### **Unit- III**

##### **Special problems :**

- Musculoskeletal & Rheumatologic diseases in CRF patients
- Special problems pertaining to Heart & Circulatory system in CRF patients
- Special problems pertaining to Digestive tract in CRF patients
- Special problems pertaining to Genitourinary tract and Male Reproductive organs in CRF patients
- Special problems pertaining to Obstetrics & Gynaecology in CRF patients
- Special problems pertaining to Nervous system in CRF patients

#### **Unit- IV**

- Common Urosurgical Procedures, instruments & their management
- ESWL

## **Unit- V**

- **Current Research in PD and Transplantation**

### **Recommended Books :**

1. Handbook of Dialysis – J.T.Daugirdas, 5<sup>th</sup> Edition, Lippincott Williams & Wilkins, 2014.
2. Dialysis Therapy – Allen R.Nissenson, Richard N.Fine, 4<sup>th</sup> Edition, Hanley &Belfus, 2007.

### **Reference Books :**

1. Dialysis History, Development and Promise – ToodS.Ing, 1<sup>st</sup> Edition, World Scientific Publishing Company, 2011.
2. Principles and Practice of Dialysis – William L.Henrich, 4<sup>th</sup> Edition, Lippincott Williams & Wilkins, 2009.
3. Basic Clinical Dialysis – David Harris, 1<sup>st</sup> Edition, McGraw – Hill Book Company Australia, 2008.
- 4.Principles and Practice of Intensive Care monitoring – Martin J.Tobin, 1<sup>st</sup> Edition, Kluwer Academic Publishers, 1998.

### **Specific Learning Outcome (SLO) :**

- Able to assess and evaluate associated patient and machine complication for special problems in Dialysis.
- Able to deliver the ICU care
- Overall goal of this training is to foster the trainee's development into an independent care provider in the field of Dialysis.

**Objective :**

- 1. To understand and apply the Principles of Dialysis and skills necessary to give safe and effective care to the individual undergoing Dialysis Therapy.
- 2. To assess the patient for any long term complications with an understanding of the problem and recognize the need to report the complications to the Physician or Nephrologist.

**Contents**

**Charts / Slides / Spotters / Case study :**

1. Diabetes in Dialysis Patients
2. Hypertension in Dialysis Patients
3. Serum enzyme levels
4. Haematological abnormalities
5. Infections in Dialysis Patients
6. Endocrine disturbances
7. Bone disease
8. Aluminium toxicity
9. Nutrition management in Peritoneal Dialysis Patients
10. Introduction to the science of Nutrition
11. Definition
12. Food pattern and its relation to Health
13. Factors influencing food habits
14. Selection of Food stuffs
15. Food storage and preservation
16. Sleep disorders
17. ESWL
18. Principles of ICU care
19. PD procedure
20. PD catheter and Exit site care
21. Performance of PD exchanges manually
22. Setting up of Automated PD equipments
23. First assessment in Minor procedures
24. PET analysis
25. CPR demonstration

## **HEALTH CARE AND BASIC PRINCIPLES (IE)**

### **1. Concept of Health Care and Health Policy**

Health in Medical Care  
Indigenous systems of Health Care & their relevance  
Framework for Health Policy Development

### **2. Health Organization**

Historical development of Health Care System in the third world & India  
Organization & Structure of Health Administration in India  
Type of Health Organization including International Organizations  
Private & Voluntary Health care provider  
Distribution of Health Care Services  
Health Care System in Public Sector Organization  
Health systems of Various Countries

### **3. Health Policy and National Health Programme**

National Health Policy  
Drug Policy  
National Health Programs (Malaria, T.B., Blindness, AIDS etc.)  
Evaluation of Health Programs (Developing indicators for evaluation)  
Medical Education & Health Manpower Development

### **4. Health Economics**

#### **Fundamentals of Economics**

Scope & Coverage  
Demand for Health Services  
Health as an Investment  
Population, health of Economic Development

### **5. Methods & Techniques of Economic Evaluation of Health Program**

Cost Benefit & Cost Effective Methods

### **6. Household & Health**

Health Expenditure & Outcome  
Rationale for Government action  
Household capacity, income and schooling

### **7. Economics of Health**

Population based health services  
Economics of Communicable and Non Communicable diseases

### **8. Health Insurance**

## **APPLIED CLINICAL RESEARCH (ELECTIVE) (IE)**

### **UNIT I: INTRODUCTION TO CLINICAL RESEARCH**

Basic pharmacology and drug development process, clinical research definition, Basic terminology used in clinical research, preclinical studies, Introduction to pharmacoeconomics, Types of clinical trials, Good Clinical Practices, and Scope of Clinical Research.

### **UNIT II: CLINICAL TRIALS**

New drug discovery process- purpose, main steps involved in new drug discovery process, timelines of each steps, advantages and purposes of each steps, Pre clinical toxicology: General principles, Systemic toxicology, animal toxicity requirements, Phase-I, II, III, IV trials: Introduction and designing, Various phases of clinical trials, Termination of trial, Safety monitoring in clinical trials.

### **UNIT III : ETHICS & REGULATIONS IN CLINICAL RESEARCH**

Ethical Theories and Foundations, Ethics Review Committee and Informed Consent Process, Integrity & Misconduct in Clinical Research Clinical Trial Application in India Import & Export of Drug in India, Investigational New Drug application (IND), New Drug Application (NDA), Abbreviated New Drug Application (ANDA), Post Drug Approval Activities, PMS, FDA Audits and Inspections EU Regulatory Affairs.

### **UNIT IV: PRINCIPLES OF CLINICAL TRIALS**

Clinical trial design (observational and interventional) protocol, consent in clinical trials, placebo, bias and methods to prevent bias, ethics in clinical trials, monitoring, problems and solutions of controlled clinical trials.

### **UNIT V: BIOSTATISTICS AND DATA MANAGEMENT**

Preparation of a successful clinical study, Study management, Project management Documentation, Monitoring, Audits and Inspections Pharmacovigilance Training in clinical research Budgeting in clinical research, Supplies and vendor management.



## **HOSPITAL MANAGEMENT(ELECTIVE) (IE)**

### **Objectives:**

To promote awareness of health care among all sections of the Indian people

To promote awareness among functionaries involved in Health and Hospital Management.

To promote research in the field of Health and Hospital Management.in order to improve the efficiency of Health Care delivery Systems.

To promote the development of high quality hospital services and community health care.

To promote a forum for the exchange of ideas and information among health and hospital planners, academicians, administrators, various statutory bodies and the general public for the improvement of Hospital and Health Care delivery Systems

To develop norms and standards for accreditation of the Health Care Organization and adopt means of evaluation of such institutions, so as to improve the quality of health care in the community

To provide opportunities for training and research in all aspects of Hospital Services Health Care Delivery System and Health Care Administration.

To update the knowledge and skill of the Health & Hospital Administrators and other personnel involved in the management of health care organization through continuous education and research.

### **UNIT – I**

**Introduction to Management:** Introduction, concept, Characteristics and nature, scope, Principles of Management, Functions and techniques.

### **UNIT II**

**Planning:** Principles, Characteristics, Essential of good planning, advantages and limitations, Classifications.

### **UNIT – III**

**Staffing:** Importance, Norms and activities, PCS, Types of PCS, Duty Roaster.

Human resource management: HR planning, Recruitment, selection process, Placement, Orientation of new staff and training, Staff development , staff promotion.

### **UNIT – IV**

**Budgeting and material management:** Purpose, Types,Principles, Function, cost benefit analysis, Auditing.

Principles of MM, process, supply and equipment, Inventory control, Procurement.

## **UNIT- V**

**Controlling-Quality management:** Essential of effective control system, Importance of controlling, TQM. Hospital and patient care, ward management. Legal Issues.

## **UNIT - VI**

**Staff development and welfare:**

Importance of staff development, Training Vs Education, Function. Staff welfare. Inservice education, Continuing education and career Opportunities-Component, manager role.

## **SEMESTER VII**

S.NO	SUBJECT
1	PROJECT AND DISSERTATION

## **SEMESTER – VII & VIII (FOR ALL SPECIALITIES)**

**Internship -12 months**



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