



**YENEPOYA UNIVERSITY**

**Deralakatte, Mangaluru - 575018**

**REGULATIONS AND CURRICULUM GOVERNING**

**UNDERGRADUATE PROGRAM**

**B.Sc RENAL DIALYSIS TECHNOLOGY**

**(CURRICULUM - EFFECTIVE FROM 2015-16)**

**ATTESTED**  
  
**Dr.Gangadhara Somayaji K.S.**  
Registrar  
Yenepoya(Deemed to be University)  
University Road, Deralakatte  
Mangalore-575 018, Karnataka



Office of the Registrar  
University Road,  
Deralakatte  
Mangalore - 575018  
Ph: 0824-2204667/68/69/71  
Fax: 0824-2203943

No.YU/REG/ACA/Academic Council-18/2014

18.10.2014

**NOTIFICATION**

Sub: Starting of B.Sc. course in Renal Dialysis Technology from the  
Academic year 2015-16 under the Faculty of Allied Health & Basic  
Sciences

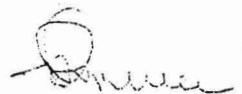
Ref: 18<sup>th</sup> meeting of the Academic Council held on 08.10.2014 (Agenda-17)

\*\*\*\*\*

The Academic Council at its meeting held on 08.10.2014 (vide Agenda - 17) and subsequently the Board of Management have approved the proposal to start 3 year + 6 months internship in B.Sc. course (Renal Dialysis Technology) as proposed by the Board of Studies concerned and recommended by the Faculty of Allied Health & Basic Sciences.

The Regulations/Syllabus as drafted by the Expert Committee headed by Dr. Santhosh Pai, Associate Professor, Nephrology and recommended by the Faculty of Allied Health & Basic Sciences has also been approved by the Academic Council.

The course shall start from the academic year 2015-16.



**REGISTRAR**

Copy to:

1. The Principal, YMC
2. Dean, Faculty of Allied Health & Basic Sciences
3. HoD, General Medicine
4. Dr. Santhosh Pai, Asso. Professor, Nephrology
5. Controller of Examinations
6. Academic Section - to write to Govt. of Karnataka & UGC in the matter

## REGULATIONS

**Objective:** To produce skilled technologist with a strong scientific foundation who has knowledge, confidence, values and skills to perform and assist diagnostic and therapeutic services in his specialty.

### **B.Sc. Renal Dialysis Technology**

#### **(B.Sc. RDT)**

#### **AIM**

The programme is designed to train the student with core knowledge in basics of clinical science and clinical nephrology procedures like

Hemodialysis

Peritoneal dialysis

Continuous renal replacement therapy (CRRT)

Hemodiafiltration

Slow low efficiency dialysis (SLED)

Plasmapheresis

Advanced dialysis procedures

Maintenance of dialysis machines and water treatment plant

A.V fistula & A.V graft cannulation and assisting nephrologists.

Assisting in emergency care

Develop teaching, clinical skills and research.

#### **By the end of the program students should be:**

Technically and clinically competent;

Aware of the importance of quality assurance;

Aware of the theoretical basis for evidence-based practice;

Effective members of the multidisciplinary team;

Prepared to participate in or initiate research into practice;

Work according to registration requirements on the respective continents.

#### **Objectives**

Along with the institution's mission of excellence in health care education, this programme concentrates on a comprehensive, patient centered educational program designed to prepare the graduate for the dynamic practice of Dialysis technology.

Leading the profession by educating the best possible health care providers, promoting lifetime learning and fostering a personal commitment to service.

**At the completion of this Program, the student should be able to –**

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

Demonstrate the use of hemodialysis equipment with an understanding of the process of operating dialysis equipment and alternate dialysis procedures.

Function as a dialysis professional under the supervision of the physician or nephrologist in a dialysis facility that provides dialysis treatment to the individuals diagnosed with acute or chronic kidney disease.

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.

Respond effectively to the physical and emotional needs of the patient undergoing dialysis treatment.

Develop the ability to understand operation, routine maintenance, identification of malfunction in equipment; troubleshooting and minor repair in equipment used in dialysis unit such hemodialysis machine, water treatment plant, dialyzer reprocessing machine, etc.

**Name of the course:**

B Sc. Renal Dialysis Technology.

**1. Eligibility for admission:**

A candidate seeking admission to the Bachelor of Renal Dialysis Technology shall have studied English as one of the principal subjects during the tenure of the course and shall have passed:

- a) Two year Pre-University examination or equivalent as recognized by Yenepoya University, Mangalore with Physics, Chemistry and Biology as principal subjects of study.

OR

- b) Pre-degree course from a recognized university considered as equivalent by Yenepoya University, (two years after ten years of schooling) with Physics, Chemistry, and Biology as principal subjects of study.

OR

- c) Any equivalent examination recognized by the Yenepoya University for the above purpose, with physics, Chemistry, and Biology as principal subjects of study.

OR

- d) Vocational higher secondary education course conducted by Vocational Higher Secondary Education, Government of Kerala with five subjects including physics, Chemistry, biology and English in addition to vocational subjects conducted, is considered equivalent to 'plus- two' (10+2) examinations of Government of Karnataka Pre University course.

OR

- e) Candidate with two years diploma from a recognized government Board in this subject of Dialysis for which the candidate desires to enroll, shall have passed 'plus-two' (10+2) with Physics, Chemistry and Biology as principle subjects OR candidates with 3 years diploma from a recognized Government Board in this subject of Dialysis which the

candidate desires to enroll, should have studied Physics, Chemistry, and Biology as principal subjects during the tenure of the course.

Note: i. the candidate shall have passed individually in each of the principal subjects

ii. Candidates who have completed diploma or vocational course through correspondence shall not be eligible for any of the courses mentioned above.

## **2. Duration of the Course**

Duration shall be for a period of three years followed by six months of internship

## **3. Maximum duration for completion of course:**

A Candidate shall complete the course within six years from date of admission, failing which re-registration shall be mandatory.

## **4. Medium of instruction:**

The medium of instruction and examination shall be in English.

## **5. Selection of eligible candidates:**

Selection of candidates for admission to the course shall be based on the marks secured in the qualifying examination followed by personal interview.

## **6. Withdrawal – Temporary and Permanent:**

### **6.1. Temporary:**

6.1.1. A candidate who has been admitted to the course may be permitted to withdraw temporarily for a period of six months or more up to one year on the grounds of prolonged illness, grave calamity in the family etc, provided:

- a. He applies stating the reason of withdrawal with supporting documents and endorsement by parent/guardian.
- b. The Institute is satisfied that without counting the period of withdrawal candidate is likely to complete his requirement of the degree within maximum time specified.
- c. There are no outstanding dues or demands with the department, library, hostel, Institute etc.

6.1.2. The tuition fee for the subsequent year may be collected in advance based on the severity of the case before giving approval for any such temporary withdrawal.

6.1.3. Scholarship holders are bound by the appropriate rules applicable

6.1.4. The decision of the Institute /university regarding withdrawal of a candidate is final and binding

## **6.2. Permanent withdrawal:**

- 6.2.1 A candidate who withdraws admission before closing date of admission for the academic session is eligible for the refund of the deposit only. The fees once paid will not be refunded on any account.
- 6.2.2 Once the admission for the year is closed, and if a candidate wants to leave the institution, he will be permitted to do so and take the Transfer Certificate from the institute, if required only after remitting all the tuition fees for the remaining years.
- 6.2.3 Those candidates who have received any scholarship/stipend/other forms of assistance from the Institute shall repay all such amounts in addition to those mentioned in the clause above.
- 6.2.4 The decision of the Institute/University regarding withdrawal of a student is final and binding.

## **7. Migration:**

Migration of candidates may be considered only if the following conditions are fulfilled:

- 7.1 On compassionate ground:
  - 7.1.1. Death of supporting guardian
  - 7.1.2. Disturbed conditions as declared by Govt. of India
- 7.2. Candidates may be permitted to migrate to another university on compassionate ground provided they comply with the academic requirements of the lower class.
- 7.3. Such application for migration shall be permitted on receiving a “No Objection” certificate from the receiving University.

## **8. Conduct and discipline:**

- 8.1. Candidates shall conduct themselves within and outside the premises of the Institute in a manner befitting the student of an Institution of national importance.
- 8.2. As per the order of Honorable Supreme Court of India, ragging in any form is considered as a criminal offence and is banned. Any form of ragging will be severely dealt with.
- 8.3. The following act of omission and/or commission shall constitute gross violation of the code of conduct and are liable to invoke disciplinary measures:
  - 8.3.1. Ragging as defined and described by the Supreme Court/Government
  - 8.3.2. Lack of courtesy and decorum; indecent behavior anywhere within or outside the campus.
  - 8.3.3. Willful damage or stealthy removal of any property/belongings of the Institute/Hostel or of fellow students/citizens.

8.3.4. Possession, consumption or distribution of alcoholic drinks or any kind of hallucinogenic drugs.

8.3.5. Mutilation or unauthorized possession of library books.

8.3.6. Noisy or unseemly behavior, disturbing studies of fellow students.

8.3.7. Hacking in computer systems (such as entering into other person's domain without prior permission, manipulation and/or damage to the computer hardware and software or any other cyber crime etc.)

8.3.8. Plagiarism of any nature.

8.3.9. Any other act of gross indiscipline as decided by the Board of Management from time to time.

8.4. Commensurate with the gravity of offense, the punishment may be: reprimand, fine, expulsion from the hostel, debarment from an examination, disallowing the use of certain facilities of the Institute, rustication for a specific period or even outright expulsion from the institute, or even handing over the case to appropriate law enforcement authorities or the judiciary, as required by the circumstances.

8.5. For any offence committed in (i) a hostel (ii) a department or in a classroom and (iii) elsewhere, the Chief Warden, the Head of the Department and the Dean (Student Affairs), respectively, shall have the authority to reprimand or impose fine.

8.6. All cases involving punishment other than reprimand shall be reported to the Vice-Chancellor.

8.7. Cases of adoption of unfair means and/or any malpractice in an examination shall be reported to the Dean (Academic Affairs) for taking appropriate action.

## **9. Graduation Requirements:**

Candidate shall be declared eligible for the award of the degree if he has:

- Fulfilled degree requirement.
- No dues to the University, Institute, Departments, Hostels, Library, etc.
- No disciplinary action pending against him.

The award of the degree must be recommended by the Board of Management.



## 10. Convocation:

Degrees will be awarded in person for the students who have graduated (with completion of Internship) during the preceding academic year. Degree will be awarded to such students who are unable to attend the convocation. Students are required to apply for the convocation along with prescribed fee within the specified date, after having satisfactorily completed all degree requirements.

## SUBJECT AND HOURS OF TEACHING FOR THEORY AND PRACTICALS

Table I: Distribution of teaching hours in first year subjects.

Sl. No	Subject	Theory No. of hours	Practical No. of hours	Total no.of hours
<b>A</b>	<b>MAIN SUBJECTS</b>			
1.	Human anatomy	70	20	90
2.	Physiology	70	20	90
3.	Biochemistry-1	70	20	90
4.	Pathology-1	70	20	90
5.	Microbiology -1	70	20	90
	Total	<b>350</b>	<b>100</b>	<b>450</b>
<b>B</b>	<b>Subsidiary subjects</b>			
1.	English	25		
2.	Kannada	25		
3.	Health-care	40		

TABLE II: Distribution of subjects and number of hours of teaching in second year.

SL.NO	SUBJECT	Theory No. of hours	Practical No.of Hours	Clinical posting	Total No.of hours
<b>A.</b>	<b>MAIN SUBJECTS</b>				
1.	Applied anatomy & Physiology related to dialysis technology	80	100	650	830
2.	Applied pathology & Microbiology related to dialysis	30+30	30+30	---	120

	technology				
3.	Pharmacology related to dialysis technology	50	--	--	50
4.	Concepts of renal disease, dialysis & nutrition	50	--	--	50
	Total	240	160	650	1050
B.	Subsidiary subjects				
1.	Sociology	20			
2.	Constitution of India	10			
3.	Environmental Science and Health	10			

Table III: Distribution of Teaching Hours in Third Year Subjects

Sl. NO	Subjects	Theory No.of hours	Practical No.of Hours	Clinical posting	Total no. of hours
A	Main subjects				
1.	Applied dialysis technology-Paper I	50	50	250	350
2.	Applied dialysis technology –paper II	50	50	250	350
3.	Applied dialysis technology -III	50	150	250	350
	Total	150	250	750	1050
B	Subsidiary subjects				
1.	Ethics	20			
2.	Research and Biostatics	10			
3.	Computer application	10			

## Attendance and Monitoring Progress of Studies:

### Attendance:

Candidates should have attended at least 75% of the total number of classes conducted in an academic year, from the date of commencement of the term to the last working day, as notified by the University, in each of the subjects prescribed for that year, separately in theory and practical, to be eligible to appear for the university examinations. Candidates lacking in prescribed percentage of attendance in any subject, either in theory or practical, in the first appearance, will not be eligible to appear for the university examination in that subject, unless they put in the required attendance, to appear in the subsequent examinations.

### Internal assessment:

There shall be minimum of three periodical Internal Assessment (IA) tests in theory and practical for each subject spread over evenly in an academic year. The average marks of the best two tests will be calculated and after reducing the marks suitably as specified.

Due to certain reasons if the department/college conducts fourth Internal Assessment the same shall be conducted at least one month before the University Examination. The average marks of the best two tests will be calculated and after reducing the marks suitably as specified.

The marks of IA shall be communicated to the university at least 15 days before the commencement of the University examination. Candidates have to secure 35% marks in the IA in each subject to become eligible to appear in the university examination. The marks of the Internal Assessment must be displayed on the notice board of the respective department/college within a fortnight from the date test is held.

If a candidate is absent for any of the tests due to genuine and satisfactory reasons, such a candidate may be given a re – test, within a fortnight of the test.

## **Scheme of Examination:**

There shall be University examinations at the end of each academic year

### **First Year Examination:**

The examination for both main and subsidiary subjects for all courses in Allied health Science shall be common in the first year.

The University examination for 1st year shall consist of theory examination only.

### **Second & Third year Examination:**

The University examination for II and III year shall consist of written Examination & Practical.

Evaluation is based on Formative Evaluation (Internal Assessment) and Summative Evaluation (University Examination).

**Criteria for Pass:**

In the first year a candidate is declared to have passed in a subject, if he/she secures 50% of marks in University Theory exam and Internal Assessment added together.

For a pass in Theory / Practical, a candidate has to secure a minimum of 40% marks in the University conducted examination including Internal Assessment.

Further a candidate shall be declared to have passed the examination in a subject if he/she secures aggregate of 50% of the marks in theory and practical.

**Rules for Grace Marks:**

Grace marks up to a maximum of 05 marks may be awarded at the discretion of the University to a student who has failed only in one subject to enable him to pass in the examination in the first attempt.

**Re – totaling:**

Re – totaling of marks is permitted only for theory papers. The university, on application within the stipulated time and remittance of prescribed fee, shall permit a re-totaling of marks, for the subjects (s) applied. The marks obtained after re-totaling will be the final marks awarded and communicated to the students.

**Carry Over**

**First Year Examination:**

A Candidate who fails in any two of the five main subjects first year shall be permitted to carry over those subjects to second year. However, he/she must pass the carry over subjects before appearing for second year examination otherwise he/she shall not be permitted to proceed to third year.

**Second year Examination.**

A Candidate is permitted to carry over any one main subject to the third year but shall pass this subject before appearing for the third year examination.

**Supplementary Examination:**

For the failed candidates or candidates promoted to II year but having carryover subject(s) shall be given a chance of supplementary exam after minimum 04 months of the declaration of the University results.

**Declaration of the Result and Classification:**

Class will be awarded only to those candidates who pass the entire examination in the first attempt. Class shall be declared on the basis of the aggregate of marks scored in individual year.

75% and above first class with Distinction

60% and above but less than 75% First class

50% and above but less than 60% Second class

**Eligibility for the award of Degree:**

A Candidate shall have passed in all the subjects of first , second and third year shall be eligible for award of degree.

**Award of Ranks:**

Ranks will be awarded on the basis of aggregate marks of I to III year examination.

Only those candidates who have completed the course in the minimum number of years prescribed (3years) and who have passed all the 3 years in the first attempt is eligible for the award of ranks.

**For 1st year**

**Main Subjects: Anatomy, Physiology, Pathology, Microbiology, Biochemistry**

**Subsidiary subjects: English, Kannada, Healthcare**

**Distribution of marks for Main/Subsidiary subjects for the first Year Theory Examination**

		Written Paper		I A Theory	Total
		Duration	Marks	Marks	Marks
<b>A</b>	<b>Main Subjects</b>				
1	Basic Anatomy (Including Histology)	3 hours	80	20	100
2	Physiology	3 hours	80	20	100
3	Biochemistry- 1	3 hours	80	20	100
4	Pathology – 1	3 hours	80	20	100
5	Microbiology – 1	3 hours	80	20	100
<b>B</b>	<b>Subsidiary Subjects</b>				
1	English	2 hours	40	10	50
2	Kannada	2 hours	40	10	50
3	Healthcare	2 hours	40	10	50

**Note :**

a) The university examination for first year shall consist of only theory examination and there shall be no university practical examination.

b) IA = Internal Assessment

c) Main Subjects shall have University Examination.

c) Examination for subsidiary subjects shall be conducted by respective college.

Distribution of type of questions and marks for Theory papers of Main Subjects:

TYPE OF QUESTIONS	NUMBER OF QUESTIONS	MARKS	TOTAL
LONG ESSAY (LE)	3 ( To attempt 2 )	02 x 10	20
SHORT ESSAY (SE)	8 ( To attempt 6 )	06 x 05	30
SHORT ANSWER(SA)	12 ( To attempt 10)	10 x 03	30
TOTAL MARKS			80

Distribution of subjects and mark for Second year examination.

Paper	Subjects					Practical			Grand total
		Uni. Exam	Viva voice	IA	Sub total				
A	Main Subjects								
1.	Applied anatomy & physiology related to dialysis technology	100	30	20	150	40	10	50	200
2.	Applied pathology & microbiology related to dialysis technology	50+50	30	20	150	40	10	50	200
3.	Pharmacology related to dialysis technology	80	--	20	100	No practical			100
4.	Concepts of renal disease, dialysis and nutrition	80	--	20	100	No practical			100
Total marks									
B	Subsidiary subjects	Duration	Marks	IA theory marks			Total marks		
1.	Sociology	3 hours	80	20			100		
2.	Constitution of India	3 hours	80	20			100		
3.	Environmental science & health	3 hours	80	20			100		

NOTE: Examination for subsidiary subjects shall be conducted by respective colleges.

Distribution of subjects and marks for Third year examination

Paper	Subjects	Theory				Practical			Grand total
		Theory	Viva voice	I A	Sub Total	Unit Practical	IA	Sub total	
A	Main Subjects								
1.	Applied dialysis technology-paper I	100	30	20	150	120 (40+40+40)	30 (10+10+10)	150	600
2.	Applied dialysis technology-paper II	100	30	20	150				
3.	Applied dialysis technology –paper III	100	30	20	150				
B	Subsidiary subjects	Duration		Marks		IA	Total marks		
1.	Ethics	3 hours		80		20	100		
2.	Research and biostatistics	3 hours		80		20	100		
3.	Computer application	3 hours		80		20	100		

Note: a) Examination for subsidiary subjects shall be conducted by respective colleges.

b) Practical – One common practical for all the three papers with equal weightage of marks i.e.40 practical marks and 10 IA marks each paper.

c) Examination for subsidiary subjects shall be conducted by respective colleges.

### Internship

6 month internship shall be mandatory after successful completion of the third year examination. The respective department shall issue ‘internship completion certificate’.

### Award of degree

A candidate who has passed in all the main and subsidiary subjects of first, second and third year and has successfully completed the internship be eligible for award of degree.



# SYLLABUS

## MAIN SUBJECTS

### First Year B.Sc. Renal Dialysis Technology

#### ANATOMY

No. of theory classes: 70 hours

No. of practical classes: 20 hours

#### 1. Introduction: human body as a whole Theory:

Definition of anatomy and its divisions

Terms of location, positions and planes, Cell and its organelles

- Epithelium-definition, classification, describe with examples, function
- Glands- classification, describe serous & mucous glands with examples
- Basic tissues – classification with examples

**Practical:** Histology of types of epithelium

Histology of serous, mucous & mixed salivary gland

#### 2. Locomotion and support Theory:

- **Cartilage** – types with example & histology
- **Bone** – Classification, names of bone cells, parts of long bone, microscopy of compact bone, names of all bones, vertebral column, intervertebral disc, fontanelles of fetal skull
- **Joints** – Classification of joints with examples, synovial joint (in detail for radiology)
- **Muscular system:** Classification of muscular tissue & histology Names of muscles of the body

**Practical:** Histology of the 3 types of cartilage

Demo of all bones showing parts, radiographs of normal bones & joints

Histology of compact bone (TS & LS)

Demonstration of all muscles of the body

Histology of skeletal (TS & LS), smooth & cardiac muscle

#### 3. Cardiovascular System Theory:

- Heart-size, location, chambers, exterior & interior Blood supply of heart
- Systemic & pulmonary circulation
- Branches of aorta, common carotid artery, subclavian artery, axillary artery, brachial artery, superficial palmar arch, femoral artery, internal iliac artery, Peripheral pulse
- Inferior venacava, Portal vein, Portosystemic Anastomosis, Great Saphenous vein, Dural venous sinuses
- Lymphatic system- cisterna chyli & thoracic duct, Histology of lymphatic tissues
- Names of regional lymphatics, axillary and inguinal lymph nodes in brief

**Practical:**

Demonstration of heart and vessels in the body

Histology of large artery & large vein, medium sized artery & vein

Microscopic appearance of large artery, medium sized artery & vein, large vein, pericardium

Histology of lymph node, spleen, tonsil & thymus

Normal chest radiograph showing heart shadows, Normal angiograms

**4. Gastro-intestinal system Theory:**

- Parts of GIT, Oral cavity (lip, tongue (with histology), tonsil, dentition, pharynx, salivary glands, Waldeyer's ring)
- Oesophagus, stomach, small and large intestine, liver, gall bladder, pancreas, Radiographs of abdomen

**5. Respiratory system Theory**

- Parts of RS, nose, nasal cavity, larynx, trachea, lungs, broncho-pulmonary segments
- Histology of trachea, lung and pleura
- Names of paranasal air sinuses

**Practical:** Demonstration of parts of respiratory system.

Normal radiographs of chest

Histology of lung and trachea

**6. Peritoneum**

**Theory:** Description in brief

**Practical:** Demonstration of reflections

**7. Urinary system Theory:**

- Kidney, ureter, urinary bladder, male and female urethra
- Histology of kidney, ureter and urinary bladder

**Practical:** demonstration of parts of urinary system

Histology of kidney, ureter, urinary bladder

Radiographs of abdomen-IVP, retrograde cystogram

**8. Reproductive system Theory:**

- Parts of male reproductive system, testis, vas deferens, epididymis, prostate (gross & histology)
- Parts of female reproductive system, uterus, fallopian tubes, ovary (gross & histology), Mammary gland – gross

**Practical:** demonstration of section of male and female pelvis with organs in situ. Histology of testis, vas deferens, epididymis, prostate Histology of uterus, fallopian tubes, ovary Radiographs of pelvis – hysterosalpingogram

## 9. Endocrine glands Theory:

- Names of all endocrine glands in detail on pituitary gland, thyroid gland, parathyroid gland, suprarenal gland – (gross & histology)

**Practical:** Demonstration of the glands

Histology of pituitary, thyroid, parathyroid, suprarenal glands

## 10. Nervous system Theory:

- Neuron, Classification of NS, Cerebrum, cerebellum, midbrain, pons, medulla oblongata, spinal cord with spinal nerve (gross & histology)
- Meninges, Ventricles & cerebrospinal fluid,
- Names of basal nuclei
- Blood supply of brain,
- Cranial nerves, Sympathetic trunk
- Names of parasympathetic ganglia

**Practical:** Histology of peripheral nerve & optic nerve

Demonstration of all plexuses and nerves in the body

Demonstration of all part of brain

Histology of cerebrum, cerebellum, spinal cord

## 11. Sensory organs Theory:

**Skin:** Skin-histology, Appendages of skin

**Eye:** Parts of eye & lacrimal apparatus, Extra-ocular muscles & nerve supply

**Ear :** Parts of ear- external, middle and inner ear, contents

**Practical:** Histology of thin and thick skin

Demonstration and histology of eyeball

Histology of cornea & retina

## 12. Embryology Theory:

- Spermatogenesis & Oogenesis, Ovulation, fertilization
- Fetal circulation
- Placenta

**Practical:**

Demonstration of models.

## REFERENCE BOOKS

1. Chaurasia: A Textbook of Anatomy
2. T.S.Ranganathan: A textbook of Human Anatomy
3. Fattana: Human anatomy (Description and applied) Saunder's & C P Prism Publishers, Bangalore–1991
4. Bhatnagar: Essentials of Human embryology. Revised Edition Orient Blackswan Pvt. Ltd.

## **PHYSIOLOGY**

No.of theory classes: 90

No .of practical classes: 20 hrs

### **BLOOD**

Introduction: composition and function of blood

Red blood cells: erythropoiesis, stages of differentiation, function, count, physiological variation.

Structure, function, concentration, physiological variation, methods of estimation of haemoglobin

White blood cells: production, function, life span, count, differential count

Platelets: origin, normal count, morphology functions

Plasma proteins: production, concentration, types, functions, albumin, globulin, fibrinogen, prothrombin

Haemostasis: definition, normal haemostasis, clotting factors, mechanism of clotting, disorders of clotting factors.

Blood Bank:

Blood groups: ABO system, Rh system

Blood grouping & typing, cross matching

Rh system: Rh factor, Rh incompatibility

Blood transfusion: indication, universal donor and recipient. Selection criteria of a blood donor, transfusion reactions.

Anticoagulants: classification, examples and uses

Anaemias: morphological and etiological classification, effects of anemia on body.

Blood indices: colour index, MCH, MCV, MCHC

Erythrocyte Sedimentation Rate: and packed cell volume, normal values, definition, determination

Blood volume: normal value, determination of blood volume and regulation of blood volume.

Blood volume: normal value, determination of blood volume and regulation of blood volume.

Body fluid: PH, normal value, regulation and variation

Lymph: lymphoid tissue formation, circulation, composition and function of lymph.

## **2. CARDIOVASCULAR SYSTEM**

Heart: physiological anatomy, nerve supply

Properties of cardiac muscle, cardiac cycle: systole, diastole. Intraventricular pressure curves.

Cardiac output, heart sounds, areas of auscultation.

Blood pressure: definition, normal value, clinical measurement of blood pressure, physiological variations, regulation of heart rate, cardiac shock, hypotension, hypertension.

Pulse: jugular, radial pulse, triple response.

Heart sounds: normal heart sounds, causes, characteristics and significance, heart rate. Electrocardiogram (ECG) significance.

## **3. DIGESTIVE SYSTEM**

Physiological anatomy of gastro intestinal tract, functions of digestive system salivary glands: structure and functions, deglutition, stages and regulation.

Stomach: structure and functions

#### **4. RESPIRATORY SYTEM**

Functions of respiratory system, physiological anatomy of respiratory system, respiratory tract, respiratory muscles.

Respiratory organs: lungs, alveoli, respiratory membrane, stages of respiration

Mechanism of normal and rigorous respiration, forces opposing and favoring expansion of the lungs.

Intra pulmonary pleural pressure, surface tension, recoil tendency, of the wall.

Transportation of respiratory gases: transportation of oxygen: direction, pressure gradient forms of transportation, oxygenation of Hb. Quantity of oxygen transported. Lung volumes and capacities.

Regulation of respiration mechanism of regulation, nervous and chemical regulation, respiratory center, Herring Breur reflexes.

Applied physiology and respirations: hypoxia, cyanosis, asphyxia, dyspnea, dysbarism, artificial respiration, apnea.

#### **5. ENDOCRINE SYSTEM**

Definition, classification of endocrine glands and their hormones, properties of hormones.

Thyroid gland hormone: hormone secreted, physiological function, regulation of secretion,

Disorders : hypo and hyper secretion of hormone

Adrenal cortex: physiological anatomy of adrenal gland, adrenal cortex, cortical hormones, functions and regulations.

Adrenal medulla: hormones, regulation and secretion. Functions of aderenaline and nor-adrenaline.

Pituitary hormones: anterior and posterior pituitary hormones, secretion, function. Hormones of pancreas.

Insulin: secretion, regulation, function and action

Diabetes mellitus: regulation of blood glucose level.

Parathyroid gland: function, action, regulation of secretion of parathyroid hormone

Calcitonin: function and action

## **6. SPECIAL SENSES**

Vision: structure of eye, function of different parts. Structure of retina

Hearing: structure and functions of ear, mechanism of hearing

Taste buds: functions

Smell: physiology, receptors.

## **7. NERVOUS SYSTEM**

Functions of nervous system, neuron, structure, classification and properties.

Neuroglia, nerve fiber, classification, conduction of impulses continuous and salutatory. Velocity of impulse transmission and factors affecting

Synapse structure, types, properties.

Receptors : definition, classification, properties

Reflex action: unconditioned properties of reflex action, Babinski's sign. Spinal cord nerve tracts. Ascending tracts, descending tracts.

- **Pyramidal tracts**

Extrapyramidal tracts, functions of medulla, pons, hypothalamic disorders. Cerebral cortex lobes and functions, sensory cortex, motor cortex, cerebellum, functions of cerebellum.

Basal ganglion: functions, EEG.

- **Autonomic Nervous system**

Sympathetic and parasympathetic distribution, functions and comparison

## **8. EXCRETORY SYSTEM**

Functions of kidneys, nephron, vasa recta, cortical and juxtamedullary nephrons, comparison, juxta glomerular apparatus: structure and function. Renal circulation peculiarities.

Mechanism of urine formation: ultra filtration criteria for filtration GFR, plasma fraction, GFR, factors affecting GFR. Determination of GFR selective reabsorption- sites of reabsorption, substance reabsorbed, mechanism of reabsorption of glucose, urea, H<sup>+</sup>, CL<sup>-</sup> amino acids etc . TMG, tubular load, renal threshold % of reabsorption of different substances, selective secretion.

Properties and composition of normal urine, urine output. Abnormal constituents in urine, mechanism of urine concentration. Counter –current mechanisms: micturition, innervation of bladder, cystometrogram.

Diuretics: water, diuretics, osmotic diuretics, artificial kidney, renal function test: plasma clearance, actions of ADH, aldosterone and PTH on kidneys.

## **9. REPRODUCTIVE SYSTEM**

Function of reproductive system, puberty

Male reproductive system: functions of testes, spermatogenesis: site, stages, factors influencing, semen. Endocrine function of testes.

Androgens: testosterone structure and functions.

Female reproductive system: ovulation, menstrual cycle: physiological changes during pregnancy, pregnancy test.

Lactation: composition of milk, factors controlling lactation



## **10. MUSCLE NERVE PHYSIOLOGY**

Classification of muscle, structure of skeletal muscle, sarcomere contractile proteins, Neuromuscular junction. Transmission across neuromuscular junction. Excitationcontraction coupling. Mechanism of muscle contraction muscle tone, fatigue, rigor mortis.

## **11. SKIN**

Structure and function, body temperature measurement, physiological variation, regulation of body temperature by physical chemical and nervous mechanism. Role of hypothalamus, hypothermia and fever.

### **PRACTICALS:**

Hemoglobinometry

White blood cell count

Red blood cell count

Determination of blood groups

Leishman's staining and differential WBC count

Determination of packed cell volume

Erythrocyte sedimentation rate

Calculation of blood indices

Determination of clotting time, bleeding time

Blood pressure recording

Auscultation of heart sounds

Artificial respiration

Determination of vital capacity

## **REFERENCE BOOKS**

1. Guyton (Arthur): Text Book of physiology Latest Ed. Prism publishers.
2. Chatterjee CC: Human Physiology Latest Ed. Vol-1, Medical Allied Agency.
3. Choudhary Sujith K: Concise Medical Physiology Latest Ed. New Central Book
4. Ganong William F: Review of medical Physiology> latest ED. Tata McGraw Hill

## **BIOCHEMISTRY**

No. Theory classes: 90 hours

No. of practical classes; 20 hrs

### **1. Specimen collection:**

Pre- analytical variables

Collection of blood

Collection of CSF& other fluids.

Urine collection

Use of preservatives

Anticoagulants

## **2. Introduction to laboratory apparatus:**

Pipettes: different types (graduated, volumetric, Pasteur, automatic etc). Calibration of glass pipettes. Burets, beakers, petri dishes, depression plates.

Flasks: different types (volumetric, round bottomed, Erle Meyer conical etc). funnels: different types(conical, Buchner etc).

Bottles: reagent bottles-graduated and common, wash bottles- different type specimen bottles

## **3. Measuring cylinders, porcelain dish**

Tubes: test tubes, centrifuge tubes, test tube draining rack, Tripod stand, wire gauze, Bunsen burner.

Cuvettes, significance of cuvettes in colorimeter, cuvettes for visible and UV range. Cuvette holder racks: bottle, test tube, pipette, desiccator, stop watch, timers, scissors.

Dispensers: reagent and sample

Maintenance of lab glass ware and apparatus, glass and plastic ware in laboratory,

Use of glass: significance of borosilicate glass, care and cleaning of glass ware, different cleaning solutions of glass.

Care and cleaning of plastic ware, different cleaning solution.

## **4. Instruments (theory and demonstration) diagrams to be drawn**

Use, care and maintenance of water bath, oven, & incubators, water distillation plant, water de ionizers, refrigerators, cold box, deep freezers, reflux condenser, centrifuge, balances, colorimeter, spectrophotometer, pH meter and electrodes.

Centrifuges: definition, principles, Svedberg unit, centrifugal force, centrifugal field, RPM, conversion of G to RPM, and vice versa, different types of centrifuges.

Manual balances: single pan, double pan, triple balance, direct read out electrical balances. Guideline to be followed and precautions to be taken while weighing. Weighing different types of chemical, liquids, hygroscopic compounds etc.

Colorimeter, spectrophotometer, pH meter, electrodes, salt bridge solution: principles, parts, types, guidelines to be followed and precaution to be taken while using.

## **5. Safety of measurements**

## **6. Conventional and SI units**

## **7. Atomic structure**

Dalton's theory, properties of electrons, protons, neutrons, Rutherford's model of atomic structure, Bohr's model of atomic structure, orbit and orbital quantum numbers, Heisenberg's uncertainty principle. Electronic configuration, Aufbau principle, Pauli's exclusion principle, etc.

Valency and bonds: different types of strong and weak bonds with examples. Theory & Practical's for all the following under this section: molecular weight, equivalent weight of elements, normality, molarity. Preparation of molar solutions (mole/litre solution) eg: 1 M NaCl, 0.15M NaCl, 1M NaOH, 0.1 M HCl, 0.1N H<sub>2</sub>SO<sub>4</sub> etc. preparations of normal solutions. Eg, 1N Na<sub>2</sub>CO<sub>3</sub>, 0.1N Oxalic acid, 0.1 N HCl, 0.1N H<sub>2</sub>SO<sub>4</sub>, 0.66 N H<sub>2</sub>SO<sub>4</sub> etc. percent solutions. Preparation of different solutions: v/v w/v(solids, liquids and acids). Conversion of a percent solution into a molar solution.

## **8. Dilutions**

Diluting solutions: e.g. preparation of 0.1 N NaCl from 1N NaCl & from 2N NaCl etc, preparing working standard from stock standard, body fluid dilutions, reagent dilution techniques, calculating the dilution of a solution, body fluids reagent etc, saturated and supersaturated solutions. Technique for preparation of standard solutions eg. Glucose, urea, etc, significance of volumetric flask in preparing standard solutions. Volumetric flasks of different sizes, preparation of standard solutions of deliquescent compounds (CaCl<sub>2</sub>, potassium carbonate,

sodium hydroxide etc.). preparation of standards using conventional and SI units acids, bases, salts and indicators.

## 9. Acids and Bases

- Definition, physical and chemical properties with examples.
- Arrhenius concept of acids and bases
- Lowery – Bronsted theory of acids and bases, classification of acids and bases
- Differences between acid and alkali, acidity and basicity, monoprotic and polyprotic acids and bases.
- Concepts of acid base reaction, hydrogen ion concentration, Ionisation of water, buffer, pH value of a solution
- Preparation of buffer solutions using pH meter
- Salts - Definition, classification; Water of crystallization – definition and different types, deliquescent and hygroscopic salts

## 10. Acid- base indicators:

- **Theory** – Definition, concept, mechanism of dissociation of an indicator, colour change of an indicator in acidic and basic conditions, use of standard buffer solution and indicators for pH determinations, preparation and its application, list of commonly used indicators and their pH range, suitable pH indicators used in different titrations, universal indicators
- **Practicals**– Titration of a simple acid and a base (Preparation of standard solution of oxalic acid, using this solution finding out the normality of a sodium hydroxide solution. Acid to be titrated using this base) Calculation of normality of an acid or a base after titration, measurement of hydrogen ion concentration

## 11. Quality control

- Accuracy
- Precision
- Specificity
- Sensitivity
- Limits of error allowable in laboratory
- Percentage error
- Normal values and Interpretations

## 12. Special Investigations:

- Serum Electrophoresis - Immunoglobulins, Drugs: Digitoxin, Theophyllines
- Regulation of Acid Base status , Henderson Hasselback Equations, Buffers of the fluid, pH Regulation, Disturbance in acid Base Balance  
Anion Gap,

- Metabolic acidosis, Metabolic alkalosis, Respiratory acidosis, Respiratory alkalosis
  - Basic Principles and estimation of Blood Gases and pH, Basic principles and estimation of Electrolytes, Water Balance, Sodium regulation, Bicarbonate buffers
- Nutrition, Nutritional support with special emphasis on parental nutrition, Calorific Value, Nitrogen Balance, Respiratory Quotient, Basal metabolic rate, Dietary Fibers, Nutritional importance of lipids, carbohydrates and proteins  
Vitamins

## **PRACTICALS**

Analysis of Normal Urine  
 Composition of urine  
 Procedure for routine screening  
 Urinary screening for inborn errors of metabolism  
 Common renal disease  
 Urinary calculus  
 Urine examination for detection of abnormal constituents  
 Interpretation and Diagnosis through charts  
 Liver Function tests  
 Lipid Profile  
 Renal Function test  
 Cardiac markers  
 Blood gas and Electrolytes  
 Estimation of Blood sugar, Blood Urea and electrolytes  
 Demonstration of Strips  
 Demonstration of Glucometer

## **REFERENCE BOOKS**

1. Varley: Clinical chemistry
2. Kaplan: Clinical chemistry
3. Vasudevan DM, Sreekumari,S: Textbook of Biochemistry for Medical students, Latest Ed
4. Das,Deba Jyothi: Biochemistry, LatestED,Academic,Publishers,Calcutta–1992
5. Rajagopal: Practical Biochemistry for Medical students-,Orient Longman PVT.Ltd.

# **PATHOLOGY**

No. of Theory classes: 70 hours

No. of Practical classes: 20 hrs

## **Theory**

### **1. Histopathology**

Introduction to histopathology

Receiving of specimen in the laboratory. Grossing techniques

Mounting techniques: various mountants

Maintenance of records and filling of the slides.

Use and care of microscope

Various fixatives, mode of action, preparation and indication, section cutting.

Tissue processing for routine paraffin sections. Decalcification of tissues.

Staining of tissues: H & E staining

Bio- medical waste management

### **2. Clinical pathology**

Introduction to clinical pathology

Collection, transport, preservation, and processing of various clinical specimens

Urine examination: collection and preservation of urine, physical, chemical, microscopic examination.

Examination of body fluids

Examination of body fluids

Examination of cerebrospinal fluid (CSF)

Sputum examination

Examination of feces

### **3. Hematology**

Introduction to hematology

Normal constituents of blood, their structure and function

Collection of blood samples

Anticoagulants used in hematology

Instruments and glassware used in hematology, preparation and use of glassware.

Laboratory safety guidelines

SI units and conventional units in hospital, laboratory.

Hb, PCV, ESR

Normal Haemostasis

Bleeding time, clotting time, prothrombin time, activated partial thromboplastin time

### **4. Blood bank**

Introduction

Blood grouping and Rh types, cross matching

### **PRACTICALS**

Urine Examination: physical, chemical, microscopic

Blood grouping Rh typing



Hb estimation, Packed Cell Volume (PCV), Erythrocyte Sedimentation Rate(ESR), Bleeding time, clotting time

Histopathology: section cutting and H & E staining

## REFERENCE BOOKS

1. Bancroft: Histopathology techniques
2. Todd & Sanford: Clinical Diagnosis by laboratory method
3. Ramanic Sood: Laboratory Technology (Methods and interpretation) 4<sup>th</sup>Ed.J.P.Bros, NewDelhi-1996.
4. Sachdev K.N.: Clinical Pathology and Bacteriology 8<sup>th</sup> Ed, J.P.Bros, New Delhi-1991.
5. Krishna: Textbook of Pathology, Orient Longman PVT Ltd NewDelhi-1991.

## MICROBIOLOGY

No. of Theory classes: 70hours

No. of Practical classes: 20hours

### Theory

#### 1. Morphology

Classification of microorganisms, size, shape and structure of bacteria. Use of microscope in the study of bacteria.

#### 2. Growth and nutrition

Nutrition, growth and multiplications of bacteria, use of culture media in diagnostic bacteriology.

#### 3. Sterilization and Disinfection

Principles and use of equipment's of sterilization namely Hot Air oven, Autoclave and serum inspissator. Pasteurization, Antiseptic and disinfectants. Antimicrobial sensitivity test

#### 4. Immunology

Immunity Vaccines, Types of Vaccine and immunization schedule

Principles and interpretation of commonly done serological tests namely Widal, VDRL, ASLO, CRP, RF & ELISA. Rapid tests for HIV and HbsAg (Technical details to be avoided)

#### 5. Systematic Bacteriology

Morphology, cultivation, diseases caused, laboratory diagnosis including specimen collection of the following bacteria (*the classification, antigenic structure and pathogenicity are not to be taught*)

Staphylococci, Streptococci, Pneumococci, Gonococci, Meningococci, C diphtheriae, Mycobacteria, Clostridia, Bacillus, Shigella, Salmonella, Esch coli, Klebsiella, Proteus, Vibrio cholerae, Pseudomonas & Spirochetes

**6. Parasitology**

Morphology, life cycle, laboratory diagnosis of following parasites  
E. histolytica, Plasmodium, Tape worms, Intestinal nematodes

**7. Mycology**

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

**8. Virology**

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

**9. Hospital infection** Causative agents, transmission methods, investigation, prevention and control Hospital infection.

**10. Principles and practice Biomedical waste management**

**Practical**

**20hours**

- Compound Microscope.
- Demonstration and sterilization of equipment's – Hot Air oven, Autoclave, Bacterial filters.
- Demonstration of commonly used culture media, Nutrient broth, Nutrient agar, Blood agar, Chocolate agar, Mac conkey medium, LJ media, Robertson Cooked meat media, Potassium tellurite media with growth, Mac with LF & NLF, NA with staph Antibiotic susceptibility test
- Demonstration of common serological tests – Widal, VDRL, ELISA.  
Grams stain, Acid Fast staining, Stool exam for Helminthic ova
- Visit to hospital for demonstration of Biomedical waste management. Anaerobic culture methods.

**REFERENCE BOOKS**

1. Anathanarayana & Panikar Medical Microbiology – Revised 8<sup>th</sup> Edition University Press
2. Robert Cruickshank – Medical Microbiology – The Practice of Medical Microbiology
3. Chatterjee – Parasitology – Interpretation to Clinical medicine.
4. Rippon – Medical Mycology
5. Emmons – Medical Mycology
6. Basic Laboratory methods in Parasitology, 1<sup>st</sup> Ed, J P Bros, New Delhi
7. Basic laboratory procedures in clinical bacteriology, 1<sup>st</sup> Ed, J P Brothers, New Delhi
8. Medical Parasitology – AjitDamle

## **SUBSIDIARY SUBJECTS**

### **First Year B.Sc. Renal Dialysis Technology**

#### **ENGLISH**

**Theory: 25 Hours**

#### **COURSE OUTLINE**

**COURSE DESCRIPTION:** This course is designed to help the student acquire a good command and comprehension of the English language through individual papers and conferences.

#### **BEHAVIOURAL OBJECTIVES:**

The student at the end of training is able to

1. Read and comprehend English language
2. Speak and write grammatically correct English
3. Appreciates the value of English literature in personal and professional life.

#### **UNIT - I: INTRODUCTION:**

Study Techniques

Organisation of effective note taking and logical processes of analysis and synthesis

Use of the dictionary

Enlargement of vocabulary

Effective dictation

#### **UNIT - II: APPLIED GRAMMAR:**

Correct usage

The structure of sentences

The structure of paragraphs

Enlargements of Vocabulary

#### **UNIT - III: WRITTEN COMPOSITION:**

Precise writing and summarizing

Writing of bibliography

Enlargement of Vocabulary

#### **UNIT - IV: READING AND COMPREHENSION:**

Review of selected materials and express oneself in one's words.

Enlargement of Vocabulary.

#### **UNIT - V: THE STUDY OF THE VARIOUS FORMS OF COMPOSITION**

Paragraph, Essay, Letter, Summary, Practice in writing

## **UNIT - VI: VERBAL COMMUNICATION:**

Discussions and summarization, Debates, Oral reports, use in teaching

Scheme of Examination

Written (Theory): Maximum Marks: 80 marks.

No Practical or Viva voce examination

This is a subsidiary subject, examination to be conducted by respective colleges. Marks required for a pass is 35%

### **REFERENCE**

1. English Grammar Collins, Birmingham University, International Language Data Base, Rupa & Co. 1993
2. Wren and Martin - Grammar and Composition, 1989, Chanda & Co, Delhi
3. Letters for all Occasions. A S Myers. Pub - Harper Perennial
4. Spoken English V. Shasikumar and P V Dhanija. Pub. By: Tata Mcgraw Hill, New Delhi
5. Journalism Made Simple D Wainwright
6. Writers Basic Bookself Series, Writers Digest series
7. Interviewing by Joan Clayton Platkon
8. Penguin Book of Interviews.

## HEALTH CARE

### 2 HEALTH CARE

**Theory: 40 Hours**

#### **Introduction to Health**

- Definition of Health, Determinants of Health, Health Indicators of India,
- Health Team Concept.
- National Health Policy
- National Health Programmes( Briefly Objectives and scope) Population of India and Family welfare programme in India

#### **Introduction to Nursing**

- What is Nursing, Nursing principles.
- Inter-Personnel relationships.
- Bandaging: Basic turns; Bandaging extremities; Triangular Bandages and their application.
- Nursing Position, prone, lateral, dorsal, dorsal re-cumbent, Fowler's positions, comfort measures, Aids and rest and sleep.
- Bed making
- Lifting And Transporting Patients: Lifting patients up in the bed. Transferring from bed to wheel chair, Transferring from bed to stretcher.
- Bed Side Management: Giving and taking Bed pan, Urinal : Observation of stools, urine.
- Observation of sputum,
- Understand use and care of catheters, enema giving.
  
- Methods of Giving Nourishment: Feeding, Tube feeding, drips, transfusion
- Care of Rubber Goods
- Recording of body temperature, respiration and pulse,
- Simple aseptic technique, sterilization and disinfection.
- Surgical Dressing: Observation of dressing procedures

#### **First Aid:**

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

#### **Reference Books:**

1. Preventive and Social Medicine by J.Park

## ಕನ್ನಡ : ಒಂದು

### ಪಠ್ಯ ಕ್ರಮದ ರೂಪರೇಖೆ

- ಸ್ಥಾನ : ಬಿ.ಎಸ್.ಸಿ. (ಅಲೈಡ್ ಹೆಲ್ತ್ ಸೈನ್ಸ್ ಕೋರ್ಸ್) ಮೊದಲ ವರ್ಷ  
ಸಮಯ : ೨೫ ಘಂಟೆಗಳು (ಇಪ್ಪತ್ತೈದು ಘಂಟೆಗಳು)  
ಪಠ್ಯಕ್ರಮದ ವಿವರಣೆ : ವಿದ್ಯಾರ್ಥಿ / ವಿದ್ಯಾರ್ಥಿನಿಯರು ದಿನ ನಿತ್ಯ ಸಂಪರ್ಕಿಸಬಹುದಾದ ಜನಸಾಮಾನ್ಯರೊಡನೆ ಶುಶ್ರೂಷೆಗೆ ಸಂಬಂಧಿಸಿದಂತೆ ಕನ್ನಡದಲ್ಲಿ ಸಂಭಾಷಣೆ ಮಾಡಲು ಹಾಗೂ ತಿಳುವಳಿಕೆ ನೀಡಲು ಸಹಕಾರವಾಗುವಂತೆ ಪಠ್ಯಕ್ರಮದ ಮಾದರಿಯನ್ನು ಅಳವಡಿಸುವುದು.  
ಉದ್ದೇಶ : ೧) ದಿನ ಬಳಕೆಯ ವ್ಯವಹಾರದಲ್ಲಿ ಶುಶ್ರೂಷಣೆಗೆ ಸಂಬಂಧಪಟ್ಟಂತೆ ಕನ್ನಡ ಭಾಷೆಗೆ ಅಳವಡಿಕೆ.  
೨) ಕನ್ನಡೇತರರಿಗೆ ಕನ್ನಡ ಭಾಷೆಯ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

### ಪಠ್ಯಕ್ರಮದ ವಿವರಣೆ

- ಘಟಕ ಒಂದು : ೧) ಅಕ್ಷರಮಾಲೆ, ಸ್ವರಗಳು, ವ್ಯಂಜನಗಳು.  
೨) ಪದ, ಪದಪೂಂಜ, ವಾಕ್ಯರಚನೆ, ಪತ್ರಲೇಖನ, ಪ್ರಬಂಧರಚನೆ.  
ಘಟಕ ಎರಡು : ಶುಶ್ರೂಷಣಾ ಪದಗಳು (ಇಂಗ್ಲಿಷ್‌ನಿಂದ ಕನ್ನಡಕ್ಕೆ ಶುಶ್ರೂಷ ಸಾಮಾನ್ಯ ಬಳಕೆಗೆ ಸಂಬಂಧಪಟ್ಟಂತೆ).  
ಘಟಕ ಮೂರು : ರೋಗಿ ಹಾಗೂ ಶುಶ್ರೂಷಕರ ಮಧ್ಯೆ ಸಾಮಾನ್ಯವಾಗಿ ನಡೆಯುವ ಸಂಭಾಷಣೆ.  
೧) ಪ್ರಶ್ನೆಗಳಿಗೆ ಸಲಹೆ ಕೊಡುವ ವಾಕ್ಯಗಳು.  
೨) ವೈದ್ಯರೊಂದಿಗೆ ಹಾಗೂ ಇತರೆ ಸಹಚರರೊಂದಿಗೆ ವ್ಯವಹರಿಸಲು, ಸಂಭಾಷಣೆ ನಡೆಸಲು ಬೇಕಾದ ವಾಕ್ಯಗಳು.

### ಅಧ್ಯಯನಕ್ಕೆ ಶಿಫಾರಸ್ಸು ಮಾಡಲಾಗಿರುವ ಗ್ರಂಥಗಳು

೧. ಕನ್ನಡ ವ್ಯಾಕರಣ (೮, ೯ ಮತ್ತು ೧೦ನೇ ತರಗತಿಗಳಿಗೆ ಕರ್ನಾಟಕ ಸರ್ಕಾರ, ಪಠ್ಯಪುಸ್ತಕಗಳ ಇಲಾಖೆ)  
೨. ವ್ಯವಹಾರಿಕ ಕನ್ನಡ : ಎಚ್.ಸಿ.ಸಿ.  
೩. ಪತ್ರ ಲೇಖನ : ಕನ್ನಡ ಸಾಹಿತ್ಯ ಪರಿಷತ್ತು  
೪. ಲೇಖನಕಲೆ : ಎನ್. ಪ್ರಹ್ಲಾದ ರಾವ್  
೫. ಆಹಾರ ಮತ್ತು ಇತರೆ ಪ್ರಬಂಧಗಳು : ಡಾ|| ಪಿ ಎಸ್ ಶಂಕರ್  
೬. ವೈದ್ಯ ಪದಗಳ ಹುಟ್ಟು ರಚನೆ : ಡಾ|| ಡಿ ಎಸ್ ಶಿವಪ್ಪ

## SECOND YEAR B.Sc RENAL DIALYSIS TECHNOLOGY

### Paper 1

#### Applied Anatomy & physiology Related to Dialysis Technology

##### Applied Anatomy

1. Basic anatomy of urinary system: structural anatomy of kidney, bladder, ureter, urethra, prostate.
2. Histology of kidney
3. Blood supply of kidney
4. Development of kidney in brief
5. Anatomy of peritoneum including concept of abdominal hernias
6. Anatomy of vascular system:
  - Upper limb vessels: course, distribution, branches, origin & abnormalities
  - Neck vessels: course, distribution, branches, origin & abnormalities
  - Femoral vessels: course, distribution, branches, origin and abnormalities.

##### Physiology

1. Mechanism of urine formation
2. Glomerular filtration rate (GFR)
3. Clearance studies
4. Physiological values of urea, creatinine, electrolytes, calcium, phosphorus, uric acid, magnesium, glucose: 24 hours of urinary indices- urea, creatinine, electrolytes, calcium, magnesium
5. Physiology of renal circulation
  - Factors contributing & modifying renal circulation
  - Autoregulation
6. Hormones produced by ht kidney & physiologic alterations in pregnancy

7. Haemostasis: coagulation cascade, coagulation factors, auto regulation, BT, CT, PT, PTT, thrombin time
8. Acid base balance: basic principles and common abnormalities like hypokalemia, hyponatremia, hyperkalemia, hypernatremia, hypocalcemia, hypercalcemia, pH, etc.
9. Basic nutrition in renal disease

## **PAPER 2**

### **Applied Aspects of Pathology and Microbiology**

#### Pathology

1. congenital abnormalities of urinary system
2. classification of renal disease
3. Glomerular diseases : causes, types & pathology
4. Tubulo- interstitial disease
5. Renal vascular disorders
6. End stage renal diseases: causes & pathology
7. Pathology of kidney in hypertension, diabetes mellitus, pregnancy
8. Pathology of peritoneum, peritonitis, bacterial, tubular & sclerosing peritonitis, dialysis induced changes
9. Pathology of urinary tract infections
10. Pyelonephritis & tuberculosis pyelonephritis

#### Microbiology

1. Hepatotropic viruses in detail: mode of transfusion, universal precautions, vaccinations
2. Human immunodeficiency virus (HIV), mode of transfusion, universal precautions.
3. Opportunistic infections
4. Microbiology of urinary tract infections
5. Microbiology of vascular access infection (femoral, jugular, subclavian catheters).
6. Sampling methodologies for culture and sensitivity.



## **Paper 3**

### **Pharmacology related to dialysis technology**

1. Iv fluid therapy with special emphasis in renal diseases
2. Diuretics: classification, actions, dosage, side effects & contraindications
3. Anti-hypertensives: classification, actions, dosage, side effects & contraindications, special reference during dialysis, vasopressors, drugs used in hypotension.
4. Drugs & dialysis: dose & duration of administration of drugs
5. Dialyzable drugs: phenobarbitone, lithium, methanol etc.
6. Vitamin D & its analogues, phosphate binders, iron, folic acid other vitamins of therapeutic value
7. Erythropoietin in detail
8. Heparin including low molecular weight heparin.
9. Protamine sulphate
10. Formalin, sodium hypochlorite, hydrogen peroxide: role as disinfectants & adverse effects of residual particles applicable to formalin.
11. Haemodialysis concentrates: composition & dilution (acetate & bicarbonates)
12. Peritoneal dialysis fluid in particular hypertonic solutions : composition
13. Potassium exchange resins with special emphasis on mode of administration

## **Paper 4**

### **Basic Concepts of Renal disease, Dialysis and Nutrition**

#### Basic Concepts of Renal Disease

1. Acute kidney injury
2. Nephrotic syndrome- primary & secondary
3. Nephritic syndrome
4. UTI (urinary tract infection)
5. Asymptomatic urinary abnormalities
6. Chronic Kidney Disease
7. Renal stone disease
8. Obstructive uropathies
9. Congenital & inherited renal disease

10. Tumors of kidney
11. Pregnancy associated renal disease
12. Renal vascular disorders & hypertension associated renal disease

#### Basic concepts of Dialysis Technology

1. Definition
2. Indications of dialysis
3. Types of dialysis
4. Principles of dialysis
5. Hemodialysis apparatus- types of dialyzer& membranes
6. Types of vascular access for haemodialysis
7. Introduction to haemodialysis machine
8. Priming of dialysis apparatus
9. Dialyser reuse
10. Common complications of haemodialysis
11. Monitoring of patients during dialysis

#### Basic concept of nutrition

1. Introduction to science of nutrition
  - Definition
  - Food pattern and its relation to health
  - Factors influencing food habits
  - Superstitions, culture, religion, income, composition of family, age, occupation, special group etc.
  - Food selection, storage and preservation
  - Prevention of food adulteration
2. Classification of nutrition
  - Macronutrients and micronutrients
  - Types, sources, requirements and deficiency of proteins
  - Sources, requirements and deficiency of carbohydrates
  - Types, sources, requirements and deficiency of fats
  - Sources, requirements and storage of drinking water
  - Types, sources, requirements and deficiency of minerals
  - Types, sources, requirements and requirements and deficiency of vitamins
3. Planning of diets
  - Need for planning of diets
  - Concepts of balanced diet
  - Food groups and balanced diet

- Influence of age, sex, occupation & physiological state
- Recommended dietary intake
- Steps in planning balanced diet
- Concepts of balanced diet for dialysis patients
- Recommended dietary intake for dialysis patients
- Planning diet for dialysis patients
- Steps in planning balanced diet for dialysis patients

## **SUBSIDIARY SUBJECTS**

### **Second Year B.Sc. Renal Dialysis Technology**

#### **SOCIOLOGY**

**Theory: 20 Hours**

#### **Course Description**

This course will introduce student to the basic sociology concepts, principles and social process, social institutions [in relation to the individual, family and community and the various social factors affecting the family in rural and urban communities in India will be studied.

- **Introduction:**  
Meaning – Definition and scope of sociology  
Its relation to Anthropology, Psychology, Social Psychology  
Methods of Sociological investigations – Case study, social survey, questionnaire, interview and opinion poll methods.  
Importance of its study with special reference to health care professionals
- **Social Factors in Health and Disease:**  
Meaning of social factors  
Role of social factors in health and disease
- **Socialization:**  
Meaning and nature of socialization  
Primary, Secondary and Anticipatory socialization  
Agencies of socialization
- **Social Groups:**  
Concepts of social groups, influence of formal and informal groups on health and sickness. The role of primary groups and secondary groups in the hospital and rehabilitation setup.

- **Family:**  
The family, meaning and definitions, Functions of types of family, Changing family patterns, influence of family on individual's health, family and nutrition, the effects of sickness in the family and psychosomatic disease and their importance to physiotherapy
- **Community:**  
Rural community: Meaning and features – Health hazards to rural communities, health hazards to tribal community.  
Urban community – Meaning and features – Health hazards of urbanities  
Culture and Health: Concept of Health, Concept of culture, Culture and Health  
Culture and Health Disorders
- **Social Change:**
  - Meaning of social changes
  - Factors of social changes
  - Human adaptation and social change  
Social change and stress
  - Social change and deviance
  - Social change and health programme
  - The role of social planning in the improvement of health and rehabilitation
- **Social Problems of disabled:**  
Consequences of the following social problems in relation to sickness and disability  
remedies to prevent these problems  
Population explosion, Poverty and unemployment Beggary  
Juvenile delinquency, Prostitution, Alcoholism  
Problems of women in employment
- **Social Security:**  
Social Security and social legislation in relation to the disabled
- **Social Work:**  
Meaning of Social Work  
The role of a Medical Social Worker

**Reference Books:**

1. Sachdeva & Vidyabhushan, Introduction to the study of sociology
2. Indrani T.K., Text book of sociology for graduate nurses and Physiotherapy students, JP Brothers, New Delhi 10

## **CONSTITUTION OF INDIA**

### **Theory: 10 Hours**

**Unit-I:** Meaning of the term 'Constitution'. Making of the Indian Constitution 1946-1950.

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

**Unit-III:** Fundamental Rights and Duties their content and significance.

**Unit – IV:** Directive Principles of States Policies the need to balance Fundamental Rights with Directive Principles.

**Unit – V:** Special Rights created in the Constitution for: Dalits, Backwards, Women and Children and the Religious and Linguistic Minorities.

**Unit-VI:** Doctrine of Separation of Powers legislative, Executive and Judicial and their functioning in India.

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

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

**Unit – IX:** Enforcing rights through Writs:

**Unit – X:** Constitution and Sustainable Development in India.

### **Books:**

1. J.C. Johari: The Constitution of India- A Politico-Legal Study-SterlingPublication, Pvt. Ltd. New Delhi.
2. J.N. Pandey: Constitution Law of India, Allahabad, Central Law Agency, 1998.
3. Granville Austin: The Indian Constitution – Corner Stone of a Nation-Oxford, New Delhi, 2000.

## MAIN SUBJECTS

### THIRD YEAR B.SC. RENAL DIALYSIS TECHNOLOGY

#### Paper 1

#### Applied Dialysis Technology-1

1. Indications of dialysis
2. History and types of dialysis
3. Theory of haemodialysis: diffusion, osmosis, ultra-filtration & solvent drag
4. Haemodialysis apparatus: types of dialyser & membrane, dialysate
5. Physiology of peritoneal dialysis
6. Dialysis machines: mechanism of functioning and management:
  - Haemodialysis machine
  - Peritoneal dialysis machine
7. Biochemical investigations required for renal dialysis
8. Adequacy of dialysis
  - Haemodialysis
  - Peritoneal dialysis
  - Peritoneal equilibration test (PET)
9. Anti-coagulation
10. Withdrawal of dialysis criteria:
  - Acute dialysis
  - Chronic dialysis
11. Dialyser reuse
12. Water treatment system

## PAPER 2

### APPLIED DIALYSIS TECHNOLOGY -2

1. Dialysis in special situations:
  - Patients with congestive cardiac failure
  - Advanced liver disease
  - Patients positive for HIV, HbSAg & HCV
  - Failed transplant
  - Poisoning cases
  - Pregnancy
2. Dialysis infants & children
3. Special dialysis procedures:
  - Continues therapies in haemodialysis
  - Different modalities of peritoneal dialysis
  - Hemodiafiltration
  - Hemoperfusion
  - SLED
  - MARS
4. Plasmapheresis
5. Special problems in dialysis patients:
  - Psychology & rehabilitation
  - Diabetes
  - Hypertension
  - Infections
  - Bone diseases
  - Aluminum toxicity
6. Renal anemia management: chronic dialysis

### **Paper-3**

#### **Applied dialysis Technology**

1. Vascular access for heamodialysis & associated complications
2. Peritoneal access devices: types of catheter, insertion techniques & associated complications
3. Complications of dialysis:
  - Haemodialysis : acute and long term complications
  - Peritoneal dialysis: mechanical and metabolic complications
4. Peritonitis & exit site infection
5. Recent advances in haemodialysis
  - Nocturnal dialysis
  - Online dialysis
  - Daily dialysis
6. Telemedicine in dialysis practice

#### **Third B.sc Renal Dialysis Technology**

##### **Practical schedule**

1. Setting up dialysis machine for dialysis
2. Av canulation
3. Av fistula/ Av graft cannulation
4. Initiation of dialysis through central venous catheters like internal jugular, femoral & subclavian vein
5. Packing & sterilization of dialysis trays
6. Closing of dialysis
7. Preparation of concentrates depending on the solutions
8. Reuse of dialysis apparatus
9. Isolated ultrafiltration
10. Performance of peritoneal dialysis exchange manually
11. Setting up of automated peritoneal dialysis equipment
12. First assistant in minor procedures
13. Skin suturing
14. CPR demonstrations



## SUBSIDIARY SUBJECTS

### Third B.Sc. Renal Dialysis Technology

#### . ETHICS & DATABASE MANAGEMENT

Theory: 20 hours

##### 1. Introduction

Medical ethics is a systematic effort to work within the ethos of medicine, which has traditionally been service to sick.

##### 2. Objectives

Identify underlying ethical issues and problems in medical practice

##### 3. Course contents (Syllabus)

###### a. Introduction to medical ethics

What is ethics, what are values and norms, freedom and personal responsibility?

###### b. Definition of medical ethics

Major principles of medical ethics.

###### c. Perspective of medical ethics

The Hippocratic oath, The Declaration of Helsinki, The WHO Declaration of Geneva, International code of Medical Ethics (1993), Medical Council of India Code of Ethics (2002).

###### d. Ethics of the individual

Truth and confidentiality, the concept of disease, health and healing, the right to health.

###### e. The ethics of human life

Prenatal sex determination.

###### f. The family and society in medical ethics

Euthanasia, cancer and terminal care.

###### g. Death and dying

Use of life-support systems, the right to die with dignity, suicide – the ethical outlook.

###### h. Professional Ethics

Contract and confidentiality, malpractice and negligence.

##### 4. Teaching/Learning Experience

a. Increasing the awareness and knowledge of students of the value dimensions of interactions with the patients, colleagues, relations and public.

b. Fostering the development of skills of analysis, decision making and judgment.

c. Making the students aware of the need to respect the rights of the patient.

d. Duties and responsibilities of the technologists.

## **BIO-STATISTICS AND RESEARCH METHODOLOGY**

1. Course description  
Introduction to basic statistical concepts  
Methods of statistical and interpretation of data introduction to research methodology
2. Objectives  
Understands statistical terms  
Possesses knowledge and skills in the use of basic statistical and research methodology
3. Contents
  - a) Unit-1: Introduction
    - i) Meaning, definitions and types of statistics
    - ii) Statistics as a singular and plural noun
    - iii) Branches of statistics
    - iv) Applications of statistics in medicine
  - b) Unit – II: presentation of data
    - i) Definition and types of data
    - ii) Raw data, the array, frequency distribution
    - iii) Basic definitions and principles of tabular presentation
    - iv) Basic principles of graphical representation
    - v) types of diagrams: Bar, Pie, line, Histograms, Pictogram
  - c) Unit-III: Measure of central tendency
    - i) Need for measure of central tendency
      - ii) Definition and calculation of mean: ungrouped and grouped
      - iii) Meaning, interpretation and calculation of median ungrouped and grouped
      - iv) Meaning and calculation of mode ungrouped and grouped
      - v) Selection of an appropriate measure of central tendency
    - c) Unit- IV: Measure of variability
      - i) Need for measure of variation
      - ii) Range and mean deviation
      - iii) Variance and standard deviation

- iv) Calculation of variance and standard deviation ungrouped and grouped
- v) Properties and uses of variance and SD

## **BASICS IN COMPUTER APPLICATIONS**

Theory: 10 hours

The course enables the students to understand the fundamentals of computer and its applications.

### **Introduction to Data processing:**

Features of computers, Advantages of using computers. Getting data into / out of computers. Role of computers. What is Data processing? Application areas of computers involved in Data processing. Common activities in processing. Types of Data processing, Characteristics of information. What are Hardware and Software?

### **Hardware Concepts:**

Architecture of computers, Classification of computers, Concept of damage. Types of storage devices. Characteristics of disks, tapes, Terminals, Printers, Network. Applications of networking concept of PC System care, Floppy care, Data care.

### **Concept of Software.**

Classification of software: System software. Application of software. Operating system. Computer system. Computer virus. Precautions against viruses. Dealing with viruses. Computers in medical electronics  
Basic Anatomy of Computers

### **Principles of programming**

Computer application - principles in scientific research; work processing, medicine, libraries, museum, education, information system.

### **Data processing**

Computers in physical therapy - principles in EMG, Exercise testing equipment, Laser.