

**REVISED ORDINANCE GOVERNING REGULATIONS
AND CURRICULUM OF**

B.Sc. RENAL DIALYSIS TECHNOLOGY COURSE - 2019



**Rajiv Gandhi University of Health Sciences,
Karnataka, Bangalore**

The Emblem



The Emblem of the Rajiv Gandhi University of Health Sciences is a symbolic expression of the confluence of both Eastern and Western Health Sciences. A central wand with entwined snakes symbolises Greek and Roman Gods of Health called Hermis and Mercury is adapted as symbol of modern medical science. The pot above depicts Amrutha Kalasham of Dhanvanthri the father of all Health Sciences. The wings above it depicts Human Soul called Hamsa (Swan) in Indian philosophy. The rising Sun at the top symbolises knowledge and enlightenment. The two twigs of leaves in western philosophy symbolises Olive branches, which is an expression of Peace, Love and Harmony. In Hindu Philosophy it depicts the Vanaspathi (also called as Oushadi) held in the hands of Dhanvanthri, which are the source of all Medicines. The lamp at the bottom depicts human energy (kundalini). The script "Devahitham Yadayahu" inside the lamp is taken from Upanishath Shanth i Manthram (Bhadram Karnebh i Shrunuyanadev...), which says "May we live the full span of our lives allotted by God in perfect health" which is the motto of the Rajiv Gandhi University of Health Sciences.



ರಾಜೀವ್ ಗಾಂಧಿ ಆರೋಗ್ಯ ವಿಜ್ಞಾನಗಳ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಕರ್ನಾಟಕ, ಬೆಂಗಳೂರು

RAJIV GANDHI UNIVERSITY OF HEALTH SCIENCES, KARNATAKA, BENGALURU
4th T Block, Jayanagar, Bengaluru – 560 041

Ref: ACA/DCD/AHS/B.Sc. RDT/366/2019-20

Date: 28/08/2019

NOTIFICATION

Sub: Revised Ordinance pertaining to Regulation and Curriculum of B.Sc. Renal Dialysis Technology.

- Ref:
- 1) Minutes of BOS Allied Health Sciences held on 13/05/2019
 - 2) Proceedings of Faculty meeting held on 15/05/2019
 - 3) Proceedings of AC meeting held on 17/06/2019
 - 4) Proceedings of Syndicate meeting held on 29/06/2019

In exercise of the powers vested under Section 35(2) of RGUHS Act, 1994, the Revised Ordinance pertaining to Regulation and the curriculum of B. Sc. Renal Dialysis Technology is notified herewith as per Annexure.

The above Regulation shall be applicable to the students admitted to the said course from the academic year 2019-20 onwards.

By Order,
Sd/-

REGISTRAR

To

The Principals of all affiliated Allied Health Sciences Course colleges of RGUHS, Bangalore.

Copy to :

1. The Principal Secretary to Governor, Raj Bhavan, Bangalore - 560001
2. The Principal Secretary Medical Education, Health & Family Welfare Dept., M S Building, Dr.B.R. Ambedkar Veedhi, Bangalore – 01
3. PA to Vice – Chancellor/PA to Registrar/Registrar (Eva.)/Finance Officer, Rajiv Gandhi University Health Sciences, Bangalore
4. All Officers of the University Examination Branch/ Academic Section.
5. Guard File / Office copy.

REVISED ORDINANCE GOVERNING REGULATIONS & CURRICULUM OF B. Sc RENAL DIALYSIS TECHNOLOGY- 2019

1. Eligibility for admission:

A candidate seeking admission to the B.Sc. Renal Dialysis Technology shall have studied English as one of the principal subject during the tenure of the course and shall have passed:

1. Two year Pre-University examination or equivalent as recognized by Rajiv Gandhi University of Health Sciences with, Physics, Chemistry and Biology as subjects of study.

OR

2. Pre-Degree course from a recognized University considered as equivalent by RGUHS, (Two years after ten years of schooling) with Physics, Chemistry and Biology as subjects of study.

OR

3. Any equivalent examination recognized by the Rajiv Gandhi University of Health Sciences, Bangalore for the above purpose with Physics, Chemistry and Biology as subjects of study.

OR

4. The 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 examinations of Government of Karnataka Pre University Course.

OR

5. Candidates with two years diploma from a recognized Government Board in Renal Technology shall have passed class 12 [10+2] with Physics, Chemistry and Biology, as subjects or candidates with 3 years diploma from a recognized Government Board in Renal Dialysis Technology should have studied Physics, Biology and Chemistry as subjects during the tenure of the course.

6. Lateral entry to second year of B.Sc. Renal Dialysis Technology for candidates who have passed diploma program from the Government Boards and recognized by RGUHS, fulfilling the conditions specified above under Sl. No. 5 and these students are eligible to take admission on lateral entry system only in the same subject studied at diploma level from the academic year 2008-09 vide RGUHS Notification no. AUTH/AHS/317/2008-09 dated:01.08.2008.

Note:

- a. The candidate shall have passed individually in each of the subjects.
- b. 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 four years including one year of Internship.

3. Medium of instruction:

The medium of instruction and examination shall be in English.

4. Scheme of examination:

There shall be three examinations one each at the end of 1st, 2nd and 3rd year.

5. Attendance

Every candidate should have attended at least 80% 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 university in each of the subjects prescribed for that year separately in theory and practical. Only such candidates are eligible to appear for the university examinations in their first attempt. Special classes conducted for any purpose shall not be considered for the calculation of percentage of attendance for eligibility. A candidate lacking in prescribed percentage of attendance in any subjects either in theory or practical in the first appearance will not be eligible to appear for the University Examination in that subject

- The marks of the internal assessment must be displayed on the notice board of the respective colleges within a fortnight from the date test is held.
- If a candidate is absent for any one of the tests due to genuine and satisfactory reasons, such a candidate may be given a re-test within a fortnight.

6. Internal Assessment (IA):1st Year B.Sc. Renal Dialysis

Theory - 20 marks

Practical - 10 marks*. [Lab work- 06 marks and Record-04 marks]

2nd & 3rd year B.Sc. Renal Dialysis

Theory – 20 Marks

Practical – 20 Marks

There shall be a minimum of two periodical tests preferably one in each term in theory and practical of each subject in an academic year. The average marks of the two tests will be calculated and reduced to 20. The marks of IA shall be communicated to the University at least 15 days before the commencement of the University examination. The University shall have access to the records of such periodical tests. The marks of the internal assessment must be displayed on the notice board of the respective colleges within a fortnight from the date test is held. If a candidate is absent for any one of the tests due to genuine and satisfactory reasons, such a candidate may be given a re-test within a fortnight.

* There shall be no University Practical Examination in First year.

7. Subject and hours of teaching for Theory and Practical

The number of hours of teaching theory and practical, subject wise in first year, second year and third year are shown in Table-I, Table-II and Table-III

Main and Subsidiary subjects are common in first year for all the courses in Allied Health Science.

The number of hours for teaching theory and practical for main subjects in first, Second and Third year are shown in Table-I, II and III.

Table - I Distribution of Teaching Hours

in First Year Subjects Main subjects

Sl. no	Subject	Theory No. of Hours	Practical No. of Hours	Total No. of Hours
1	Human Anatomy	70	20	90
2	Physiology	70	20	90
3	Biochemistry I	70	20	90
4	Pathology I (Clinical Pathology, Haematology & Blood Banking)	70	20	90
5	Microbiology	70	20	90
	Total	350	100	450

The classes in main and subsidiary subjects are to be held from Monday to Thursday. On Fridays and Saturdays students shall work in hospitals in the respective specialty or department chosen by them

Subsidiary Subjects

English 25 Hours

Kannada 25 Hours

Health-Care 40 Hours

Clinical/Lab posting –470 hours (Friday 9am – 1pm and 2pm - 4-30 pm Saturday 9am - 1pm)

Table - II Distribution of Teaching Hours in

Second Year Subjects Main Subjects

Sl. no	Subject Theory No. of Hours	Practical No. of Hours	Clinical Postings Total No. of Hours		
1	Applied anatomy & physiology related to dialysis technology	80 (40+40)	30 (15+15)	--	110
2	Pharmacology related to dialysis technology	40	10	--	50
3	Concepts of renal disease & its management	50	100	630	780
4	Applied aspects of pathology & microbiology	80 (40+40)	30 (15+15)	--	110
5	Basics in Renal Dialysis Technology	80	120	--	200
	Total	330	290	630	1250

Subsidiary Subjects:

Sociology 20 Hours

Constitution of India 10 Hours Environmental Science & Health 10 Hours Nutrition

Table - III Distribution of Teaching Hours in

Third Year Subjects Main Subjects

Sl. no	Subjects Theory No. of Hours	Practical No. of Hours	Clinical Posting Total No. of Hours		
1	Applied Dialysis Technology Paper I	125	100	300	525
2	Applied Dialysis Technology Paper II	125	100	300	525
	Total	250	200	600	1050

Subsidiary Subjects:

Ethics, Database Management	50 Hours
Research & Biostatistics	20 Hours
Computer application	10 Hours
Basic Sciences	35 Hours

8. Schedule of Examination:

The university shall conduct two examinations annually at an interval of not less than 4 to 6 months as notified by the university from time to time. A candidate who satisfies the requirement of attendance, progress and conduct as stipulated by the university shall be eligible to appear for the university examination. Certificate to that effect shall be produced from the Head of the institution along with the application for examination and the prescribed fee.

9. Scheme of Examination

There shall be three examinations, one each at the end of I, II and III year. The examination for both main and subsidiary subjects for all courses in Allied Health Sciences shall be common in the first year. Distribution of Subjects and marks for First Year, Second year & Third year University theory and practical Examinations are shown in the Table – IV, V & VI.

First year examination:

The University examination for 1st year shall consist of only theory examination and there shall be no University Practical Examination.

Second & Third year examination:

The University examination for 2nd and 3rd year shall consist of Written Examination & Practical.

Written Examinations consists of

03 papers in the 2nd Year 03 papers in the 3rd Year.

Practical examination:

Three practical examinations, at the end 2nd Year and three practical examinations at the end of the 3rd year.

TABLE-IV
Distribution of Subjects and marks for First Year University theory Examination

A	Main Subjects*	Written Paper		I A Theory	Total
		Duration	Marks	Marks	Marks
1	Basic Anatomy (Including Histology)	3 Hours	80	20	100
2	Physiology	3 Hours	80	20	100
3	Biochemistry	3 Hours	80	20	100
4	Pathology	3 Hours	80	20	100
5	Microbiology	3 Hours	80	20	100
	Subsidiary Subject**				
1	English	3 Hours	80	20	100
2	Kannada	3 Hours	80	20	100
3	Health Care	3 Hours	80	20	100

Note: I A = Internal Assessment

*Main Subjects shall have

University Examination.

There shall be no University

Practical Examination.

** Subsidiary subjects: Examination for subsidiary subjects shall be conducted by respective colleges

TABLE – V
Distribution of Subjects and marks for Second Year Examination of B.Sc. Renal Dialysis

Paper	Theory Subject	Practicals				Univ. Prac I	Sub	Total Grand	Total
		Univ. exam	Viva Voice.	IA	Sub Total				
I	Concepts of Renal Disease and its Management	80	--	20	100	No Practicals	--	-- 100	
II	Applied aspects of pathology & microbiology	100	30	20	150	80	20	100	250
III	Applied anatomy & physiology related to dialysis technology	80	--	20	100	No Practical	--	--	100
IV	Pharmacology related to dialysis technology	80	--	20	100	No practical	--	--	100
V	Basics in Renal Dialysis Technology	100	30	20	150	80	20	100	250

Distribution of Subsidiary Subjects and marks for Second Year Examination of B.Sc. Renal Dialysis

B	Subsidiary Subject**	Duration	Marks	I A 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
4	Nutrition	3 Hours	80	20	100

** Subsidiary subjects: Examination for subsidiary subjects shall be conducted by respective colleges

TABLE – VI

Distribution of Subjects and marks for Third Year Examination of B.Sc Renal Dialysis

Paper	Theory Subject	Univ. exam	Practical			Univ. Prac	IA	Sub Total	Grand Total
			Viva Voice	IA	Sub Total				
I	Applied dialysis technology paper-I	100	30	20	150	80	20	100	400
II	Applied dialysis technology paper-II	100	30	20	150	(40 + 40)	(10+10)		

Distribution of Subsidiary Subjects and marks for Third Year Examination of B.Sc. Renal Dialysis

B	Subsidiary Subject**	Duration	Marks	I A Theory Marks	Total Marks
1	Ethics, Database Management	3 Hours	80	20	100
2	Research & Biostatistics	3 Hours	80	20	100
3	Computer Application	3 Hours	80	20	100
4	Basic sciences	3 Hours	80	20	100

** Subsidiary subjects : Examination for subsidiary subjects shall be conducted by respective colleges

10. Pass criteria

10.1. First year examination

a. Main Subjects: 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.

b. Subsidiary Subjects: The minimum prescribed marks for a pass in subsidiary subject shall be 35% of the maximum marks prescribed for a subject. The marks obtained in the subsidiary subjects shall be communicated to the University before the Commencement

of the University examination.

10.2. Second and Third year Examination

a. Main Subjects: A candidate is declared to have passed the examination in a subject if he/she secures 50% of the marks in Theory and 50% in practical separately. For a pass in theory, a candidate has to secure a minimum of 40% marks in the University conducted written examination, and 50% in aggregate in the University conducted written examination and internal assessment added together and for pass in Practical, a candidate has to secure a minimum of 40% marks in the university conducted Practical/Clinical examination and 50% in aggregate i.e. University conducted Practical/Clinical and Internal Assessment.

b. Subsidiary Subjects: The minimum prescribed marks for a pass in subsidiary subject shall be 35% of the maximum marks prescribed for a subject. The marks obtained in the subsidiary subjects shall be communicated to the University before the commencement of the University examination.

11. Carry over benefit

11.1 First year examination:

A candidate who fails in any two of the five main subjects of 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.

11.2. 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.

12. Declaration of Class

a. A candidate having appeared in all the subjects in the same examination and passed that examination in the first attempt and secures 75% of marks or more of grand total marks prescribed will be declared to have passed the examination with Distinction.

b. A candidate having appeared in all subjects in the same examination and passed that examination in the first attempt and secures 60% of marks or more but less than 75% of grand total marks prescribed will be declared to have passed the examination in First Class.

c. A candidate having appeared in all the subjects in the same examination and passed that examination in the first attempt and secures 50% of marks or more but less than 60% of grand total marks prescribed will be declared to have passed the examination in Second Class.

d. A candidate passing the university examination in more than one attempt shall be placed in Pass class irrespective of the percentage of marks secured by him/her in the examination.

e. The marks obtained by a candidate in the subsidiary subjects shall not be considered for award of Class or Rank.

[Please note, fraction of marks should not be rounded off clauses (a), (b) and (c)]

13. Eligibility for the award of Degree:

A candidate shall have passed in all the subjects of first, second and third year to be eligible for a compulsory 12 months of rotational internship. On completion of 12 months of the internship with pass criteria in outgoing clinical assessment exams the candidate is then eligible for the award of degree.

14. Distribution of Type of Questions and Marks

for Various Subjects THEORY

SUBJECTS HAVING MAXIMUM MARKS= 100		
Type of Questions	No. of Questions	Marks for Each Questions
Essay Type	3 (2 x 10)	10
Short Essay Type	12 (10 x 5)	05
Short Answer Type	12 (10 x 3)	03

SUBJECTS HAVING MAXIMUM MARKS= 80 (for first year B.Sc.)		
Type of Questions	NO. of questions	Marks for Each Questions
Short Essay Type	10 (8 x 5)	40
Short Answer Type	12 (10 x 3)	30
To The Point Answer	07 (5 x 2)	10

SUBJECTS HAVING MAXIMUM MARKS= 80 (for second and third year B.Sc.)		
Type of Questions	No. of Questions	Marks for Each Questions
Essay Type	3 (2 x 10)	10
Short Essay Type	8 (6 x 5)	05
Short Answer Type	12 (10 x 3)	03

SUBJECTS HAVING MAXIMUM MARKS= 60		
Type of Questions	No. of Questions	Marks for Each Questions
Essay Type	3 (2 x 10)	10
Short Essay Type	7 (5 x 5)	05
Short Answer Type	7 (5 x 3)	03

SUBJECTS HAVING MAXIMUM MARKS= 50		
Type of Questions	No. of Questions	Marks for Each Questions
Essay Type	3 (2 x 10)	10
Short Essay Type	5 (3 x 5)	05
Short Answer Type	7 (5 x 3)	03

INTERNSHIP

12 month compulsory rotational postings during which students have to work under the supervision of experienced staff .

FIRST YEAR B.SC RENAL DIALYSIS TECHNOLOGY

ANATOMY

No. of theory classes: 70 hours No. of practical classes: 20 hours

Chapter 1

Introduction:

Theory:

- Definition of anatomy and its divisions
- Terms of location, positions and planes
- Epithelium-definition, classification, describe with examples, function
- Glands- classification, describe serous, mucous & mixed glands with examples
- Basic tissues – classification with examples

Practical:

- Histology of types of epithelium
- Histology of serous, mucous & mixed salivary gland

Chapter 2

Connective tissue:

Theory:

- Cartilage – types with example & histology theory
- 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
- Histology of compact bone (TS & LS)
- Histology of skeletal (TS & LS) & cardiac muscle
- Demo of all bones showing parts, radiographs of normal bones & joints
- Demonstration of important muscles of the body

3. Cardiovascular system:

Theory:

- Heart-size, location, chambers, exterior & interior, pericardium
- 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
- Inferior vena cava, 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 & vein, medium sized artery & vein
- Histology of lymph node, spleen, tonsil & thymus
- Radiology: Normal chest radiograph showing heart shadows

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, spleen, peritoneum & reflections

Practical:

- Demonstration of parts of GIT
- Radiographs of abdomen

5. Respiratory system

- Parts of RS: nose, nasal cavity, larynx, trachea, lungs, bronchopulmonary segments, diaphragm
- Histology of trachea, lung and pleura

- Names of paranasal air sinuses

Practical:

- Demonstration of parts of respiratory system.
- Normal radiographs of chest, X-ray paranasal sinuses
- Histology of lung and trachea

6. 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

7. 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, uterus, fallopian tubes, ovary
- Radiographs of pelvis – hysterosalpingogram

8. Endocrine glands

Theory:

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

Practical:

- Demonstration of the glands
- Histology of pituitary, thyroid, parathyroid, suprarenal glands

9. 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

10. 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 and contents

Practical:

- Histology of thin and thick skin
- Demonstration and histology of eyeball
- Histology of cornea & retina

11. Embryology:

Theory:

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

INTERNAL ASSESSMENT

Theory-average of 2 exams conducted 20
Practicals: record and lab work* 10

*There shall be no university practical examination and internal assessment marks secured in Practical need not be sent to the university.

SCHEME OF EXAMINATION THEORY

There shall be one theory paper of three hours duration carrying 80 marks. Distribution of type of questions and marks for Anatomy shall be as given under.

SUBJECTS HAVING MAXIMUM MARKS= 80 (for first year B.Sc)		
Type of Questions	NO. of questions	Marks for Each Questions
Essay Type	3 (2 x 10)	10

Short Essay Type	8 (6 x 5)	05
Short Answer Type	12 (10 x 3)	03

Distribution of Marks for University Theory and Practical Exam

Theory				Practicals			Grand total
Theory	Viva Voce	IA	Sub Total	Practicals	IA	Sub Total	
80	-	20	100	*			100

REFERENCE BOOKS:

1. William Davis (P) understanding Human Anatomy and Physiology – McGraw Hill
2. Chaurasia- A Text Book of Anatomy
3. T. S. Ranganathan- A Text Book of Human Anatomy
4. Fattana, Human Anatomy (Description and applied)- Saunder's & C P Prism Publishers, Bangalore
5. ESTER. M. Grishcimer- Physiology & Anatomy with Practical Considerations, J. P. Lippin Cott. Philadelphia
6. Bhatnagar- Essentials of Human Embryology- Revised Edition. Orient Blackswan Pvt. Ltd.

PHYSIOLOGY

Theory 70 hours

Practical 20hours

1. General Physiology

Introduction to cell physiology, transport across cell membrane
Homeostasis, Body Fluid compartment & measurement

2. Blood

Introduction - composition and function of blood

Plasma. proteins, types and functions

Red blood cells - erythropoiesis, stages of differentiation, factors affecting it, function, normal count, physiological variation.

Hemoglobin- function, concentration, types & methods of Hb estimation, fate of hemoglobin

Jaundice-types Anaemia,-types

ESR, PCV, osmotic fragility & blood indices

WBC- morphology, production, functions, normal count, differential count, variation, variation

Immunity (in brief)

Platelets- origin, morphology, normal count, function-Platelet plug ,bleeding disorder

Haemostasis - definition, normal haemostasis, clotting factors, mechanism of clotting, anticoagulants disorders of clotting factors.

Blood group-ABO & Rh system, Rh incompatibility blood typing ,cross matching, hazards of mismatched blood transfusion

RES, spleen and lymph

3. Nerve-Muscle

Neuron structure, types, neuroglia-types, nerve fibre classification, properties of nerve fibres, RMP,action potential, wallerian degeneration

NMJ, blockers, Myasthenia gravis

Classification of muscle, structure of skeletal muscle, sarcomere, contractile proteins

Excitation contraction coupling, mechanism of muscle contraction, types of contraction

Motor unit, fatigue, rigor mortis Smooth muscle

4. Respiratory system

Physiological anatomy of respiratory system, muscles of respiration, respiratory & non respiratory functions of lungs, dead space

Mechanics of breathing, intrapulmonary & pleural pressures

Compliance, Surfactant, Hyaline membrane disease

Lung volumes and capacities

Respiratory membrane , transport of O₂ & CO₂

Chemical regulation of respiration

Neural regulation of respiration

Hypoxia, Acclimatization,

Dysbarism. Artificial respiration

Definition-Periodic breathing ,dyspnoea, apnoea, asphyxia,, cyanosis

5. Cardiovascular system

Introduction to CVS & general principles of circulation

Properties of Cardiac muscle

Cardiac cycle, heart sounds, Pulse

Cardiac output, factors and measurement

Heart rate
BP-factors, measurement, Short term regulation
Intermediate and long term regulation of BP
ECG uses and significance, normal waveform, heart block
Coronary circulation, Cutaneous circulation-Triple response
Shock
Effects of exercise on CVS and Respiratory system

6. Renal system, Skin and body temperature
Kidneys- functions, structure of nephron, type, juxtaglomerular apparatus-structure and function, non-excretory functions of kidney
Glomerular filtration rate (GFR)- Definition, normal value, factors affecting GFR
Tubular reabsorption - sites, substance reabsorbed, mechanisms of reabsorption
Tubular secretion- sites, substance secreted, mechanisms of reabsorption
Counter current mechanism of concentration of urine
Obligatory and Facultative reabsorption of water
Micturition reflex, Diuretics
Artificial kidney, renal function tests-clearance tests
Skin -structure and function, body temperature measurement, physiological variation,
Regulation of body Temperature by physical, chemical and nervous mechanisms-Role of Hypothalamus
Hypothermia and fever

7. Digestive system
Physiological anatomy, Enteric nervous system & functions of GIT
Saliva- composition, regulation, disorder.
Deglutition- stages & disorders
Stomach-functions, composition and regulation of gastric juice
Gastric motility, MMC, vomiting reflex.
Pancreas- function, composition and regulation of pancreatic juice
Liver & gall bladder-functions, bile- composition, secretion and regulation
Small intestine- Succus entericus-composition, functions & movements
Large intestine- functions, movements and defecation reflex
Digestion & absorption of Carbohydrates, fats and proteins

8. Endocrine system
Classification of Endocrine glands & their hormones & properties-chemistry and receptor, feedback mechanisms of hormone regulation.
Anterior pituitary hormones- secretion, functions, disorders
Posterior pituitary hormones- secretion, functions, disorders
Thyroid hormones- secretion, functions, disorders
Parathyroid hormones- secretion, functions, disorders
Calcium homeostasis & disorders
Pancreatic hormones, -Insulin and Glucagon- secretion, functions, disorders
Adrenal cortex- Glucocorticoids & Mineralocorticoids, Androgen - secretion, functions, disorders
Adrenal medulla- secretion, functions, disorders Thymus & Pineal gland

9. Reproductive system
Introduction to reproductive system, sex differentiation & Puberty
Male reproductive system, functions of testosterone & Spermatogenesis
Female reproductive system, functions of Estrogen, Progesterone, Oogenesis
Ovulation & Menstrual cycle
Physiological changes during pregnancy, pregnancy tests, parturition & lactation
Male & Female contraceptive methods

10. Central nervous system
Introduction to CNS, Sensory receptors classification, properties

Synapse– classification, properties
 Sensory pathways: Anterior spino thalamic tract and Posterior column pathway
 Lateral spino thalamic tract, Types of pain, Referred pain, Thalamus; nuclei and function
 Classification of reflexes, Monosynaptic reflex- Stretch reflex , muscle spindle ,inverse stretch reflex. Polysynaptic reflex-Withdrawal reflex
 Motor pathways : Pyramidal pathway and functions, UMNL, LMNL
 Cerebral cortex (Sensory and motor)-functions, Medulla and Pons-functions
 Cerebellum –functions, disorders
 Basal ganglia-functions, disorders
 Hypothalamus and Limbic system-functions
 CSF, lumbar puncture
 Sleep, EEG,
 Autonomic Nervous System - Sympathetic and parasympathetic distribution and functions

11. Special senses

Vision –Functional anatomy of eye, visual pathway, lesion
 Refractive errors, color vision
 Audition – Physiological anatomy of ear, Mechanism of hearing, auditory pathway, deafness
 Olfaction –modalities, receptor, function, abnormalities
 Gustation-modalities, receptor, function, taste pathway, abnormalities

Practicals

Blood pressure Recording
 Auscultation for Heart Sounds
 Artificial Respiration
 Determination of vital capacity

INTERNAL ASSESSMENT

Theory-average of 2 exams conducted 20
 Practicals: record and lab work* 10

*There shall be no university practical examination and internal assessment marks secured in Practicals need not be sent to the university.

SCHEME OF EXAMINATION THEORY

There shall be one theory paper of three hours duration carrying 80 marks. Distribution of type of questions and marks for Physiology shall be as given under.

SUBJECTS HAVING MAXIMUM MARKS= 80 (for first year B.Sc)		
Type of Questions	NO. of questions	Marks for Each Questions
Essay Type	3 (2 x 10)	10
Short Essay Type	8 (6 x 5)	05
Short Answer Type	12 (10 x 3)	03

Distribution of Marks for University Theory and Practical Exam

Theory				Practicals			Grand total
Theory	Viva Voce	IA	Sub Total	Practicals	IA	Sub Total	
80	-	20	100	*			100

REFERENCE BOOKS:

Guyton (Arthur) Text Book of Physiology. Latest Ed. Prism Publishers

Chatterjee (CC) Human Physiology Latest Ed. Vol. 1, Medical Allied Agency

Choudhari (Sujith K) Concise Medical Physiology Latest Ed. New Central Book

Ganong (William F) Review of Medical Physiology. Latest Ed. Appleton

BIOCHEMISTRY

No. Theory classes: 70hours

No. of practical classes: 20 hours

1. Carbohydrate Chemistry [3 hours]

- Classification (Definition/ examples for each class)
- Monosaccharides (classification depending upon number of carbon atoms and functional group with examples)
- Disaccharides (Sucrose/ lactose/ maltose and their composition)
- Polysaccharides :
 - a) Homopolysaccharides (Structure of starch and glycogen)
 - b) Heteropolysaccharides (Functions)

2. Lipid Chemistry [3 hours]

- Definition of lipids
- Functions of lipids in the body
- Classification of lipids (subclasses with examples)
- Definition and Classification of fatty acids
- Essential fatty acids
- Phospholipids and their importance

3. Amino-acid and Protein Chemistry [3 hours]

- General structure of D and L amino acids
- Amino acids; Definition and Classification of amino acids with examples.
- Peptides; definition & Biologically important peptides
- Classification of Proteins based on composition, functions and shape (with examples)
- Functions of amino acids and Proteins

4. Nucleotide and Nucleic acid Chemistry [3 hours]

- Nucleosides & Nucleotides

- Nucleic acid Definition & types
- Composition & functions of DNA & RNA
- Structure of DNA (Watson and Crick model)
- Structure of tRNA, & functions of tRNA, rRNA, mRNA
- Difference between DNA and RNA

5. Enzymes [5 hours]

- Definition & Classification of Enzymes with example
- Definitions of Active site, Cofactor (Coenzyme, Activator),
- Proenzyme; Definition and examples (Pepsin & trypsin)

6. Digestion and Absorption [3 Hours]

- General characteristics of digestion and absorption,
- Digestion and absorption of carbohydrates, proteins and lipids.

7. Carbohydrate Metabolism [5 Hours]

- Glycolysis ; Aerobic, Anaerobic, Definition , Site and subcellular site , Steps with all the enzymes and coenzymes at each step , mention the regulatory enzymes , Energetics,
- Citric acid cycle; Pyruvate dehydrogenase complex (reaction and coenzymes) , Site and subcellular site , Reactions with all the enzymes and coenzymes ,Regulatory enzymes , Energetics
- Significance of HMP Shunt pathway.
- Hyperglycemic and hypoglycemic hormones
- Blood Glucose Regulation.
- Diabetes mellitus (definition, classification, signs and symptoms)
- **Glycogen metabolism and gluconeogenesis**

8. Lipid Metabolism [4 Hours]

- Introduction to lipid metabolism, Lipolysis
- Beta oxidation of fatty acids ; Definition ,Site and subcellular site , Activation of palmitic acid , Transport of activated palmitic acid into mitochondria , Reactions , Energetics.

- Name the different ketone bodies . Note on ketosis

9. Amino acid and Protein Metabolism [3 Hours]

- Introduction, transamination, deamination, Fate of ammonia, transport of ammonia,
- Urea cycle.

10. Vitamins [5 Hours]

- Definition and classification.
- RDA, sources, coenzyme forms, biochemical functions and disorders for the following water soluble vitamins: Thiamine, Niacin, Pyridoxine, Cobalamin, Folic acid, Ascorbic acid
- RDA, sources, coenzyme forms, biochemical functions and deficiency disorders for the following fat soluble vitamins; A and vitamin D

11. Mineral Metabolism [3 Hours]

- Name the macro/ microminerals
- Iron: Sources ,RDA, Functions and Disorders of deficiency and excess
- Calcium and phosphorus: Sources ,RDA, functions, normal serum levels and hormones regulating their levels

12. Nutrition [6 hours]

- Balanced diet (Definition)
- Caloric value ; Definition , Caloric values of carbohydrates, proteins and fats
- Total daily caloric requirements of an adult male and female,
- RDA (Definition, standard values for nutrients)
- Basal metabolic rate(BMR) ; Definition , Magnitude of BMR in men and women, Factors affecting BMR
- Thermic effect/ SDA of food (Definition, values for major macronutrients)
- **Carbohydrates ; Daily dietary requirement. 2. Dietary fibers (Definition, functions, importance and their daily requirements)**
- **Proteins ; Daily requirement, Biological value. a. Definition b. Protein used as a standard for this, Protein sources with high and low biological value , Mutual supplementation of proteins (Definition, examples).**

- **Fats ; Daily requirement , Essential fatty acids (Definition, functions, daily requirement and deficiency manifestations) , Saturated and unsaturated fatty acids (Definition, sources, examples).**
- **Malnutrition**

13. Renal Function Tests [2 hours]

- Name the different tests to assess the kidney functions
- Explain Creatinine clearance & Inulin clearance
- Urinary acidification test

14. Radioactive Isotopes [1 hour]

- Definition, clinical applications
- Biological effects of radiations

15. Clinical Biochemistry [5 hours]

A. Definitions of acid, base, pH and pKa [1 hour]

B. Buffers • Definition [2 hours]

- Henderson Hasselbalch equation,
- Principal buffer systems in the ECF ICF and urine
- Bicarbonate and phosphate buffer systems (pKa value, normal ratio of base/acid in the plasma)
- Acidosis & Alkalosis (Definition, classification, causes and biochemical findings)

C. Normal serum levels and condition where they are altered [2 hour]

- Glucose, Protein, urea, uric acid, and creatinine
- Bilirubin, cholesterol
- Serum Electrolytes

16. Fundamental Chemistry (1 hour)

- Valency, Molecular weight & Equivalent weight of elements and compounds. Normality, Molarity, Molality.

17. Solutions: Definition, use, classification where appropriate, preparation and storage (5 hours)

- Stock and working solutions.
- Molar and Normal solutions of compounds and acids. (NaCl, NaOH, HCl, H₂SO₄, H₃PO₄, CH₃COOH etc.,)
- Preparation of percent solutions – w/w, v/v w/v (solids, liquids and acids), Conversion of a percent solution into a molar solution
- Saturated and supersaturated solutions
- Standard solutions. Technique for preparation of standard solutions and Storage. E.g: glucose, albumin etc.
- Dilutions- Diluting Normal , Molar and percent solutions. Preparing working standard from stock standard.
- Part dilutions: Specimen dilutions. Serial dilutions. Reagent dilution. Dilution factors

ASSIGNMENT TOPICS

1. **Units of measurement**
2. Hazards - Physical, Chemical, Biological
3. Arterial blood gas analysis
4. Responsibilities of Health care personnel
5. Biomedical waste management

Total theory hours = 70

PRACTICAL DEMONSTRATION [20 hours]

- Color Reactions of Carbohydrates & amino acids.
- Precipitation Reactions of proteins
- Colorimetry
- Estimation of Blood glucose Folin Wu and enzymatic method
- Estimation of Urea by DAM method

INTERNAL ASSESSMENT

Theory-average of 2 exams conducted 20

*There shall be no university practical examination and internal assessment marks secured in Practicals need not be sent to the university.

SCHEME OF EXAMINATION THEORY

There shall be one theory paper of three hours duration carrying 80 marks. Distribution of type of questions and marks for Biochemistry I shall be as given under.

SUBJECTS HAVING MAXIMUM MARKS= 80 (for first year B.Sc)		
Type of Questions	NO. of questions	Marks for Each Questions
Essay Type	3 (2 x 10)	10
Short Essay Type	8 (6 x 5)	05
Short Answer Type	12 (10 x 3)	03

Distribution of Marks for University Theory and Practical Exam

Theory				Practicals			Grand total
Theory	Viva Voce	IA	Sub Total	Practicals	IA	Sub Total	
80	-	20	100	*			100

Text Book References

- Biochemistry – 3rd revised edition by U Sathyanarayana & U Chakrapani
- Textbook of Medical Biochemistry-6th Edition by MN Chatterjea & Rana Shinde
- Textbook of Medical Laboratory technology 2nd edition by Godkar and Godkar.
- Biochemistry-3rd edition by Pankaja Naik
- Medical Laboratory technology 6th edition by Ramnik Sood.
- Manipal Manual of Clinical Biochemistry for medical laboratory and M.Sc., students-3rd edition by Shivananda Nayak B
- Varley's Practical Clinical Biochemistry, 4th, 5th and 6th editions

PATHOLOGY

Clinical Pathology, Hematology and Blood Banking

Theory-70 hours

Practicals-20 hours

I. Clinical Pathology- Theory

- Introduction to clinical pathology
- Collection , transport, preservation and processing of various clinical specimens
- Urine examination- collection and preservation, Physical, chemical and microscopic examination for abnormal constituents
- Examination of Body fluids
- Examination of Cerebrospinal fluid (CSF)
- Sputum examination
- Examination of feces

II. Hematology – Theory

- Introduction to hematology
- Normal constituents of Blood, their structure and functions
- Collection of Blood samples
- Various anticoagulants used in Hematology
- Hemoglobin estimation, different methods and normal values
- Packed cell volume
- Erythrocyte sedimentation rate
- Normal Haemostasis
- Bleeding time. Clotting time, prothrombin time, Activated partial Thromboplastin time

III. Blood Bank- Theory

- Introduction blood banking
- Blood group system
- Collection and processing of blood for transfusion
- Compatibility testing
- Blood transfusion reactions
- **1) General Pathology:**
- **2) Cell injury:**
 - a. Definition, causes.
 - b. Cellular adaptations – Hypertrophy, hyperplasia, atrophy and metaplasia.
 - c. Types of cell injury – Reversible and irreversible; morphology of reversible injury.
 - d. Necrosis – Definition and patterns of tissue necrosis.
 - e. Intracellular accumulations – Lipids, cholesterol, proteins, glycogen and pigments; examples.
 - f. Pathologic calcification – Types and examples.

- **3) Inflammation:**
 - a. Definition and signs of inflammation.
 - b. Types – Acute and chronic inflammation.
 - c. Acute inflammation – Causes, morphological patterns and outcome.
 - d. Chronic inflammation – Causes, morphology and examples.
 - e. Regeneration and repair – Mechanism of cutaneous wound healing.
 - f. Factors affecting wound healing.

- **4) Hemodynamic disorders:**
 - a. Edema – Definition, pathogenesis and types: Renal, cardiac, pulmonary and cerebral.
 - b. Difference between transudate and exudate.
 - c. Shock – Definition, types of shock with examples: Hypovolemic, cardiogenic and septic shock, stages of shock: Nonprogressive, progressive and irreversible.
 - d. Thrombosis – Definition, mechanism of thrombus formation (Virchow's triad) and fate of thrombus.
 - e. Embolism – Definition and types: Thromboembolism, fat, air and amniotic fluid embolism.
 - f. Infarction – Definition and examples.

- **5) Immune system:**
 - a. Autoimmune diseases – General features, enumerate systemic and organ specific autoimmune diseases.
 - b. Systemic lupus erythematosus – Manifestations and diagnosis.

- **6) Neoplasia:**
 - a. Definition and nomenclature of tumors.
 - b. Differences between benign and malignant neoplasms.
 - c. Enumerate modes of carcinogenesis: Genes, physical, chemical and microbial agents of carcinogenesis.
 - d. Modes of spread of tumors.
 - e. Clinical aspects of neoplasia.
 - f. Grading and staging of cancers.
 - g. Laboratory diagnosis of cancer.

Practicals

1. Urine analysis- Physical, Chemical, Microscopic
2. Blood grouping and Rh typing
3. Hb estimation , packed cell volume (PCV), Erythrocyte Sedimentation rate (ESR)
4. Bleeding time and Clotting time

INTERNAL ASSESSMENT

Theory-average of 2 exams conducted 20

Practicals: record and lab work* 10

*There shall be no university practical examination and internal assessment marks secured in Practical need not be sent to the university.

SCHEME OF EXAMINATION THEORY

There shall be one theory paper of three hours duration carrying 80 marks. Distribution of type of questions and marks for Pathology I shall be as given under.

SUBJECTS HAVING MAXIMUM MARKS= 80 (for first year B.Sc)		
Type of Questions	NO. of questions	Marks for Each Questions
Essay Type	3 (2 x 10)	10
Short Essay Type	8 (6 x 5)	05
Short Answer Type	12 (10 x 3)	03

Distribution of Marks for University Theory and Practical Exam

Theory				Practicals			Grand total
Theory	Viva Voce	IA	Sub Total	Practicals	IA	Sub Total	
80	-	20	100	*			100

REFERENCE BOOKS:

1. Culling Histopathology techniques
2. Bancroft Histopathology techniques
3. Koss- Cytology
4. Winifred Diagnostic cytopathology
5. Orell Cytopathology
6. Todd and Sanford- clinical diagnosis by Laboratory Medicine
7. Dacie and Lewis- Practical Hematology
8. Ramnik SOOD. Lab technology, Methods and interpretation, 4 th edition JP Bros New Delhi, 1996
9. Sathish Gupta , Short text book of Medical laboratory techniques for technicians
10. Sachdev K N. Clinical Pathology and Bacteriology, 8 th edi JP Bros, New Delhi, 1996

MICROBIOLOGY

Theory: 70 Hours

Practicals: 20 Hours

Microbiology

1. Introduction

(6 hrs)

History of Microbiology,

Classification of microorganisms,

Microscope (Different types and uses)

Morphology of bacterial cell.

2. Growth and nutrition

(6 hrs)

Growth and Nutrition

Multiplication of bacteria,

Culture media and Culture methods.

3. Sterilization and disinfection

(6 hrs)

Principles and use of equipments of sterilization,

Chemicals used in disinfection

4. Biomedical waste management principle and practice

5. Immunology

(8 hrs)

Immunity (Innate and Acquired immunity)

Antigen (Definition, types, factors of antigenicity)

Antibody (Properties, Structures Classes of immunoglobulins)

List Antigen antibody reactions.

Vaccines

Immunization schedule

6. Infection

(5hrs)

Definition, types and mode of transmission

Hospital infections – causative agents, mode of transmission and prophylaxis

Antimicrobial susceptibility testing

7. Systematic bacteriology

(15 hrs)

Disease caused and lab diagnosis of medically important bacteria.

(Staphylococcus, Streptococcus, Gonococcus, Echerichia coli, Klebsiella, Proteus Salmonella, Shigella, Vibrio, Pseudomonas, Mycobacteria, Treponema,)

(No need of classification, antigenic structure, virulence mechanism)

8. Parasitology

(10hrs)

Introduction to Parasitology

List of medically important parasites and diseases

(E.histolytica, Plasmodium, Ascaris, Ancylostoma, W.bancrofti, Tape worm)

Lab diagnosis of parasitic infections

9. Virology

(10 hrs)

Introduction to virology

List of medically important viruses and diseases

HIV,

Hepatitis,

Rabies,

Polio,

Arboviruses (Chikungunya,Dengue,KFD,)

Lab diagnosis of viral infections

10. Mycology

(9 hrs)

Introduction to Mycology

List of medically important fungi and diseases

(Candidiasis, Cryptococcosis, Dermatophytes, Aspergillosis and Mucor mycosis)

Lab diagnosis of fungal infections

11. Automated techniques

PRACTICALS

(20hrs)

Compound Microscope

Demonstration and sterilization of equipments

Demonstration of commonly used culture media and media with growth

Antibiotic susceptibility test

Demonstration of common serological tests –widal, VDRL,

Grams stain, Acid fast staining

Stool exam for Helminthic ova

INTERNAL ASSESSMENT

Theory-average of 2 exams conducted 20

Practicals: record and lab work* 10

*There shall be no university practical examination and internal assessment marks secured in Practical need not be sent to the university.

SCHEME OF EXAMINATION THEORY

There shall be one theory paper of three hours duration carrying 80 marks. Distribution of type of questions and marks for Microbiology I shall be as given under.

SUBJECTS HAVING MAXIMUM MARKS= 80 (for first year B.Sc)		
Type of Questions	NO. of questions	Marks for Each Questions
Essay Type	3 (2 x 10)	10
Short Essay Type	8 (6 x 5)	05
Short Answer Type	12 (10 x 3)	03

Distribution of Marks for University Theory and Practical Exam

Theory				Practicals			Grand total
Theory	Viva Voce	IA	Sub Total	Practicals	IA	Sub Total	
80	-	20	100	*			100

Reference Books-

1. Ananthanarayana & Panikar Medical Microbiology- 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, J P Bros, New Delhi
7. Basic Laboratory procedures in clinical bacteriology, J P Bros, New Delhi
8. Medical Parasitology- Ajit Damle
9. Introduction to medical microbiology- Ananthanarayana- Orient Longman Pvt. Ltd

SUBSIDIARY SUBJECTS

ENGLISH

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 diction

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

Teaching Hours : 40

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, Bed making, prone, lateral, dorsal, dorsal re-cumbent, Fowler's positions, comfort measures, Aids and rest and sleep.

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:

Preventive and Social Medicine by J.Park

Text Book of P & SM by Park and Park

Counseling & Communicate skills for medical and health, Bayne- Orient Longman Pvt. Ltd.

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%

SECOND YEAR B.SC RENAL DIALYSIS TECHNOLOGY

APPLIED ANATOMY & PHYSIOLOGY RELATED TO DIALYSIS TECHNOLOGY PAPER 1

APPLIED ANATOMY

Basic Anatomy Of Urinary System- Structural Anatomy Of Kidney, Bladder, Uretr, Urethra, Prostate Histology Of Kidney

Blood Supply Of Kidney

Development Of Kidney In Brief

Anatomy Of Peritoneum Including Concept Of Abdominal Hernias

Anatomy Of Vasculat System

Upper Limb Vessels- Course, Distribution, Branches, Origin & Abnormalities

Neck Vessels- Course, Distribution, Branches, Origin & Abnormalities

Femoral Vessels- Course, Distribution, Branches, Origin & Abnormalities

PHYSIOLOGY

Mechanism Of Urine Formation Glomerular Filtration Rate (gfr) Clearance Studies

Physiological Values - Urea, Creatinine, Electrolytes, Calcium, Phosphorous, Uric Acid, Magnesium, Glucose 24

Hours Urinary Indices - Urea, Creatinine, Electrolytes, Calcium, Magnesium

Physiology Of Renal Circulation

Factors Contributing & Modifying Renal

Circulation Autoregulation

Hormones Produced By Kidney & Physiologic Alterations In Pregnancy

Haemostasis - Coagulation Cascade, Coagulation Factors, Auto Regulation, Bt, Ct, Pt, Ptt, Thrombin Time

Acid Base Balance - Basic Principles & Common Abnormalities Like Hypokalemia, Hyponatremia,

Hyperkalemia, Hyponatremia, Hypocalcemia, Hypercalcemia, Ph, Etc.

Basic Nutrition In Renal Diseases

Scheme of Examination Theory

There shall be one theory paper of three hours duration carrying 80 marks. Distribution of type of questions and marks for APPLIED ANATOMY & PHYSIOLOGY RELATED TO DIALYSIS TECHNOLOGY PAPER 1 shall be as given under.

TYPE OF QUESTION	NUMBER OF QUESTIONS	MARKS	SUB-TOTAL
LONG ESSAY (LE)	3 (To attempt 2)	2 X 10	20
SHORT ESSAY (SE)	8 (To attempt 6)	6 X 5	30
SHORT ANSWER (SA)	12 (To attempt 10)	10 X 3	30
TOTAL MARKS			80

NO PRACTICAL EXAMINATION

PHARMACOLOGY RELATED TO HAEMO & PERITONEAL DIALYSIS PAPER II

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

Scheme of Examination Theory

There shall be one theory paper of three hours duration carrying 50 marks. Distribution of type of questions and marks for PHARMACOLOGY RELATED TO HAEMO & PERITONEAL DIALYSIS PAPER II shall be as given under.

TYPE OF QUESTION	NUMBER OF QUESTIONS	MARKS	SUB-TOTAL
LONG ESSAY (LE)	3 (To attempt 2)	2 X 10	20
SHORT ESSAY (SE)	8 (To attempt 6)	6 X 5	30
SHORT ANSWER (SA)	12 (To attempt 10)	10 X 3	30
TOTAL MARKS			80

NO PRACTICAL EXAMINATION

CONCEPTS OF RENAL DISEASES CLINICAL MANIFESTATIONS EVALUATION & MANAGEMENT OF THE PAPER-III

FOLLOWING DISEASES

1. Acute renal failure
2. Nephrotic syndrome - primary & secondary
3. Nephritic syndrome
4. Uti - urinary tract infections
5. Asymptomatic urinary abnormalities
6. Chronic renal failure
7. Renal stone diseases
8. Obstructive uropathies
9. Congenital & inherited renal diseases
10. Tumors of kidney
11. Pregnancy associated renal diseases
12. Renal vascular disorders & hypertension associated renal diseases

Scheme of Examination Theory

There shall be one theory paper of three hours duration carrying 80 marks.

Distribution of type of questions and marks for CONCEPTS OF
RENAL DISEASES PAPER III

TYPE OF QUESTION	NUMBER OF QUESTIONS	MARKS	SUB-TOTAL
LONG ESSAY (LE)	3 (To attempt 2)	2 X 10	20
SHORT ESSAY (SE)	8 (To attempt 6)	6 X 5	30
SHORT ANSWER (SA)	12 (To attempt 10)	10 X 3	30
TOTAL MARKS			80

NO PRACTICAL EXAMINATION

APPLIED ASPECTS OF PATHOLOGY & MICROBIOLOGY PAPER IV

Pathology

50marks

1. Congenital abnormalities of urinary system
2. Classification of renal diseases
3. Glomerular diseases - causes, types & pathology
4. Tubulointerstitial diseases
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

9. dialysis induced changes
10. Pathology of urinary tract infections
11. Pyelonephritis & tuberculous pyelonephritis

MICROBIOLOGY II

Theory - 30 hrs.

I Sterilization and Disinfection in Dialysis Unit

2. Hepatotropic Viruses - HAV, HBV, HCV

Mode of transmission, clinical manifestations, laboratory diagnosis and prophylaxis

3. **HIV** - Mode of transmission, clinical manifestations, laboratory diagnosis and prophylaxis

4. Universal precaution and biomedical waste management.

5. **Opportunistic infections** - Definition, types

- Give detailed account of following

Candidiasis

Cryptococcosis

Aspergillosis

M.tuberculosis

Isospora, cyclospora and cryptosporidium

6. **UTI** - Definition classification, causative agents, clinical manifestations and laboratory diagnosis.

7. **Vascular access infection** - definition, types (femoral, jugular, subclavian catheters) Causative agents, clinical manifestations and laboratory diagnosis.

8. Sampling methodologies for culture and sensitivity

PRACTICALS - 5 hrs.

1. Staining technique (performance)

- * Gram stain
- * ZN stain

2. Demonstration of culture media and culture methods

3. Demonstration of antibiotic sensitivity testing

4. Demonstration of sterilization equipments

Scheme of examination theory

There shall be one theory paper of three hours duration carrying 50 marks. Distribution of type of questions and marks for applied aspects of pathology & microbiology

TYPE OF QUESTION	NUMBER OF QUESTIONS	MARKS	SUB-TOTAL
LONG ESSAY (LE)	3 (To attempt 2)	2 X 10	20
SHORT ESSAY (SE)	12 (To attempt 10)	10 X 5	50
SHORT ANSWER (SA)	12 (To attempt 10)	10 X 3	30
TOTAL MARKS			100

Practical exam: 80 marks

BSC. RENAL DIALYSIS TECHNOLOGY BASICS OF DIALYSIS TECHNOLOGY PAPER-V

1. Dialysis team
2. Basic chemistry, body fluids and electrolytes
3. History of HD
4. Indications of dialysis
5. Types of hemodialysis
6. Principles of HD
7. Initiation of Dialysis Therapy
8. Water treatment unit [WTU]
9. HD equipment
10. Types of dialyzer
11. Dialyzer membrane
12. Composition of dialysate
13. Cannulation of vascular access in HD

14. Vascular access and its types and complication
15. Vascular access recirculation
16. Hemodialysis adequacy
17. Anti-coagulation
18. Methods and complications of dialyzer re-use
19. Infection control and universal precaution
20. Psychological aspect of dialysis patients
21. Drugs and dialysis
22. Anemia and erythropoietin use

Scheme of Examination Theory

There shall be one theory paper of three hours duration carrying 100 marks. Distribution of type of questions and marks for Basics of dialysis technology

TYPE OF QUESTION	NUMBER OF QUESTIONS	MARKS	SUB-TOTAL
LONG ESSAY (LE)	3 (To attempt 2)	2 X 10	20
SHORT ESSAY (SE)	12 (To attempt 10)	10 X 5	50
SHORT ANSWER (SA)	12 (To attempt 10)	10 X 3	30
TOTAL MARKS			100

Practical exam: 80 marks

SUBSIDIARY SUBJECT:

Nutrition

Introduction to science of nutrition

- Definition
- Food pattern and its relation to health
- Factors influencing food habits, selection and food stuffs
- Superstitions, culture, religion, income, composition of family, age, occupation, special group etc
- Food selection, storage & preservation
- Prevention of food adulteration

Classification of nutrients

- Macronutrients and micronutrients
- Proteins - types, sources, requirements and deficiencies of proteins
- Carbohydrates sources, requirements & deficiency
- Fats - types, sources, requirements and deficiency of fats
- Water - sources of drinking water, requirements, preservation of water
- Minerals - types, sources, requirements deficiencies of minerals

- Vitamins - types, sources, requirements deficiencies of vitamins

Planning diets

- Need for planning diets
- Concept of a balanced diet
- Food group & balanced diet
- Influence of age, sex, occupation & physiological state
- Recommended dietary intake in planning diet
- Steps in planning balanced diet
- Planning renal diet

Introduction to cookery

- Purposes and methods of cooking
- Effects of heat on cooking of foods
- Preparation of basic recipes - clear fluids
- Full fluids, vegetable preparation, egg recipes, fish and meat recipes, light puddings

THIRD YEAR B.Sc RENAL DIALYSIS TECHNOLOGY

APPLIED DIALYSIS TECHNOLOGY PAPER I

1. Patient assessment
2. Acute complication
3. MARS
4. Plasmapheresis
5. Hemoperfusion
6. Nutrition in dialysis
7. Paediatric dialysis
8. Slow continuous therapies
9. High flux and high efficiency dialysis
10. Machine monitoring in dialysis
11. Lab data analysis
12. Quality assurance in HD
13. Dialysis Amyloidosis
14. Ascites in dialysis patients
15. Pregnancy in dialysis patients
16. Bone disease
17. Aluminum toxicity
18. Sleep disorder
19. GI disturbances in dialysis
20. CARE of HIV, HBV & HCV patients

Scheme of examination theory

There shall be one theory paper of three hours duration carrying 100 marks. Distribution of type of questions and marks for applied dialysis technology paper shall be as given under.

TYPE OF QUESTION	NUMBER OF QUESTIONS	MARKS	SUB-TOTAL
LONG ESSAY (LE)	3 (To attempt 2)	2 X 10	20
SHORT ESSAY (SE)	12 (To attempt 10)	10 X 5	50
SHORT ANSWER (SA)	12 (To attempt 10)	10 X 3	30
TOTAL MARKS			100

Practical exam: 80 marks

One common practical for all the three papers with equal weight age of marks
i.e. 40 practical marks for each paper.

APPLIED DIALYSIS TECHNOLOGY PAPER II

1. History of peritoneal dialysis
2. Physiology of PD
3. Indication and contraindication of chronic PD
4. PD apparatus
5. Access for CAPD
6. Catheter and exit-site care
7. PD process
8. Assessment of peritoneal membrane permeability
9. Adequacy of PD
10. PD therapies
11. Non-infectious complications
12. Infectious complications
13. Patient education
14. Types of renal donor and cadaver donor maintenance
15. Recipient and donor workup
16. Post-transplant management and follow up
17. Immunosuppression therapy
18. Urosurgical procedures
19. Principal of ICU care

Scheme of examination theory

There shall be one theory paper of three hours duration carrying 100 marks. Distribution of type of questions and marks for applied dialysis technology paper shall be as given under.

TYPE OF QUESTION	NUMBER OF QUESTIONS	MARKS	SUB-TOTAL
LONG ESSAY (LE)	3 (To attempt 2)	2 X 10	20
SHORT ESSAY (SE)	12 (To attempt 10)	10 X 5	50
SHORT ANSWER (SA)	12 (To attempt 10)	10 X 3	30
TOTAL MARKS			100

Practical exam: 80 marks

One common practical for all the three papers with equal weight age of marks
i.e. 40 practical marks for each paper.

PRACTICAL SCHEDULE

1. Setting up dialysis machine for dialysis
2. AV cannulation
3. AV fistula/av graft cannulation
4. Initiation of dialysis through central venous catheters like internal jugular, femoral & subclavian vein
5. Packing & sterilisation of dialysis trays
6. Closing of dialysis
7. Preparation of concentrates depending on the situations
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

BASIC SCIENCE

1. Medicalethics & therelevant medico legal aspects
 - Responsibilities & duties
 - Ethical behavior & conduct

 - Medico legal aspects and its relation to consumer protection act
2. Biomedical waste & Its management
3. Cardiopulmonary resuscitation - basic cardiac life support & advanced cardiac life support
4. Critical care nephrology - management of renal failure in ICU
5. Basic principles of blood transfusion & fluid therapy
6. Sterilization - material & methods
7. Renal transplantation - principles, immunology, patients selection, surgical procedure, complications, post-transplant evaluation & management