Revised Ordinance Governing Regulations and Curriculum

of

B.Sc. RENAL DIALYSIS TECHNOLOGY

COURSE - 2019

Rajiv Gandhi University of Health Sciences, Karnataka, Bangalore
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 Shanthi 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.
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.
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
Practicals - 10 marks*: [Lab work- 06 marks and Record-04 marks]

2nd & 3rd year B.Sc. Renal Dialysis
Theory – 20 Marks

Practicals – 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 the 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 Practicals

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

<table>
<thead>
<tr>
<th>Main subjects</th>
<th>Theory No. of Hours</th>
<th>Practical No. of Hours</th>
<th>Total No. of Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human Anatomy</td>
<td>70</td>
<td>20</td>
<td>90</td>
</tr>
<tr>
<td>Physiology</td>
<td>70</td>
<td>20</td>
<td>90</td>
</tr>
<tr>
<td>Biochemistry I</td>
<td>70</td>
<td>20</td>
<td>90</td>
</tr>
<tr>
<td>Pathology I (Clinical Pathology, Haematology &amp; Blood Banking)</td>
<td>70</td>
<td>20</td>
<td>90</td>
</tr>
<tr>
<td>Microbiology</td>
<td>70</td>
<td>20</td>
<td>90</td>
</tr>
<tr>
<td>Total</td>
<td>350</td>
<td>100</td>
<td>450</td>
</tr>
</tbody>
</table>

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)
Table - II Distribution of Teaching Hours in Second Year Subjects

Main Subjects

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

Subsidiary Subjects:

- Sociology: 20 Hours
- Constitution of India: 10 Hours
- Environmental Science & Health: 10 Hours
- Nutrition: 20 Hours

Table - III Distribution of Teaching Hours in Third Year Subjects

Main Subjects

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Subjects</th>
<th>Theory Hours</th>
<th>No. of Hours</th>
<th>Practical No. of Hours</th>
<th>Clinical Posting</th>
<th>Total No. of Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Applied Dialysis Technology Paper I</td>
<td>125</td>
<td>100</td>
<td>300</td>
<td>525</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Applied Dialysis Technology Paper II</td>
<td>125</td>
<td>100</td>
<td>300</td>
<td>525</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>250</td>
<td>200</td>
<td>600</td>
<td>1050</td>
<td></td>
</tr>
</tbody>
</table>
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

03papers 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**

<table>
<thead>
<tr>
<th>A</th>
<th>Main Subjects*</th>
<th>Written Paper</th>
<th>IA A Theory</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Duration</td>
<td>Marks</td>
<td>Marks</td>
<td>Marks</td>
</tr>
<tr>
<td>1</td>
<td>Basic Anatomy (Including Histology)</td>
<td>3 Hours</td>
<td>80</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>Physiology</td>
<td>3 Hours</td>
<td>80</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>Biochemistry</td>
<td>3 Hours</td>
<td>80</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>Pathology</td>
<td>3 Hours</td>
<td>80</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>Microbiology</td>
<td>3 Hours</td>
<td>80</td>
<td>20</td>
</tr>
</tbody>
</table>

**Subsidiary Subject**

<table>
<thead>
<tr>
<th></th>
<th>English</th>
<th>3 Hours</th>
<th>80</th>
<th>20</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Kannada</td>
<td>3 Hours</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>Health Care</td>
<td>3 Hours</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
</tbody>
</table>

**Note:** IA = 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**

<table>
<thead>
<tr>
<th>Paper</th>
<th>Subject</th>
<th>Theory</th>
<th>Practicals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Univ. Exam</td>
<td>Viva Voice.</td>
</tr>
<tr>
<td>I</td>
<td>Concepts of Renal Disease and its Management</td>
<td>80</td>
<td>--</td>
</tr>
<tr>
<td>II</td>
<td>Applied aspects of pathology &amp; microbiology</td>
<td>100</td>
<td>30</td>
</tr>
<tr>
<td>III</td>
<td>Applied anatomy &amp; physiology related to dialysis technology</td>
<td>80</td>
<td>--</td>
</tr>
<tr>
<td>IV</td>
<td>Pharmacology related to dialysis technology</td>
<td>80</td>
<td>--</td>
</tr>
</tbody>
</table>
**Basics in Renal Dialysis Technology**

| 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 |

**TABLE – VI**

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

<table>
<thead>
<tr>
<th>Paper</th>
<th>Subject</th>
<th>Theory</th>
<th>Practical</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Univ. exam</td>
<td>Viva</td>
</tr>
<tr>
<td>I</td>
<td>Applied dialysis technology paper-I</td>
<td>100</td>
<td>30</td>
</tr>
<tr>
<td>II</td>
<td>Applied dialysis technology paper-II</td>
<td>100</td>
<td>30</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>B</th>
<th>Subsidiary Subject**</th>
<th>Duration</th>
<th>Marks</th>
<th>I A Theory Marks</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ethics, Database Management</td>
<td>3 Hours</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>Research &amp; Biostatistics</td>
<td>3 Hours</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>Computer Application</td>
<td>3 Hours</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>Basic sciences</td>
<td>3 Hours</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
</tbody>
</table>

**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 six months of rotational internship. On completion of six months of the internship the candidate is then eligible for the award of degree.

14. Distribution of Type of Questions and Marks for Various Subjects

**THEORY**

<table>
<thead>
<tr>
<th>SUBJECTS HAVING MAXIMUM MARKS= 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Questions</td>
</tr>
<tr>
<td>--------------------</td>
</tr>
<tr>
<td>Essay Type</td>
</tr>
<tr>
<td>Short Essay Type</td>
</tr>
<tr>
<td>Short Answer Type</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SUBJECTS HAVING MAXIMUM MARKS= 80 (for first year B.Sc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Questions</td>
</tr>
<tr>
<td>--------------------</td>
</tr>
<tr>
<td>Short Essay Type</td>
</tr>
<tr>
<td>Short Answer Type</td>
</tr>
<tr>
<td>To The Point Answer</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SUBJECTS HAVING MAXIMUM MARKS= 80 (for second and third year B.Sc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Questions</td>
</tr>
<tr>
<td>--------------------</td>
</tr>
<tr>
<td>Essay Type</td>
</tr>
<tr>
<td>Short Essay Type</td>
</tr>
<tr>
<td>Short Answer Type</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SUBJECTS HAVING MAXIMUM MARKS= 60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Questions</td>
</tr>
<tr>
<td>--------------------</td>
</tr>
<tr>
<td>Essay Type</td>
</tr>
<tr>
<td>Short Essay Type</td>
</tr>
<tr>
<td>Short Answer Type</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SUBJECTS HAVING MAXIMUM MARKS= 50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Questions</td>
</tr>
<tr>
<td>--------------------</td>
</tr>
<tr>
<td>Essay Type</td>
</tr>
<tr>
<td>Short Essay Type</td>
</tr>
<tr>
<td>Short Answer Type</td>
</tr>
</tbody>
</table>
INTERNSHIP

Six month compulsory rotational postings during which students have to work under the supervision of experienced staff in the following areas:

1. Clinical Pathology - 1 month
2. Clinical Biochemistry - 2 months
3. Clinical Microbiology - 2 months
4. Blood banking - 1 month

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, medium sized artery & vein, large 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, bronchopulmonary 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
   Kidney, ureter, urinary bladder, male and female urethra
   Histology of kidney, ureter and urinary bladder
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, 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

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

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 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 Anatomy shall be as given under.

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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)- Sauder’s & C P Prism Publishers, Bangalore
5. ESTER, M. Grishcimer- Physiology & Anatomy with Practical Considerations, J. P. Lippin Cott. Philadelphia
PHYSIOLOGY

Theory 70 hours
Practical 20 hours

Introduction

Composition and function of blood

Red blood cells — Erythropoiesis, stages of differentiation function, count physiological Variation.
Haemoglobin — structure, function, concentration physiological variation, White blood cells . types &
functions & immunity.
Platelets — Normal count, functions.
Plasma Proteins — Concentration, types, albumin, globulin, Fibrinogen, Prothrombin functions.
Haemostasis — Definition, normal haemostasis, clotting factors, mechanism of clotting, disorders of clotting
factors.

Blood Bank

Blood groups — ABO system, Rh system Blood grouping & typing
Crossmatching
Rh system — Rh factor, Rh incompatibility.
Blood transfusion — Indication, universal donor and recipient concept.
Selection criteria of a blood donor. Transfusion reactions
Anticoagulants — Classification, examples and uses
Anaemias : Classification — morphological and etiological. Effects of anemia on body Blood indices —
Colour index, MCH, MCV, MCHC
Erythrocyte sedimentation Rate (ESR) and Paced cell volume
Normal values, Definition. Determination
Lymph
Body fluid compartments, function of lymph

1.Cardiovascular system
Heart ~ Properties of Cardiac muscle
Cardiac cycle-systole, diastole
Cardiac Output — Definition & Normal value
Heart sounds- Normal heart sounds Areas of auscultation, Causes
Blood Pressure — Definition, normal value, Physiological variations, regulation of BP, cardiac shock, hypotension, hypertension. Triple response
Electrocardiogram (ECG) — significance.

2. Digestive System - Physiological anatomy of Gastro intestinal tract
Salivary glands - Functions
Deglutition — stages
Stomach — Functions
Gastric secretion – Composition, function, phases of gastric secretion.
Pancreas — Function, composition of pancreatic juice.
Liver — functions of liver.
Bile composition, bile salts function, Bilirubin metabolism, types of bilirubin, Vandernberg reaction, Jaundice- types, significance.
Gall bladder — functions.
Intestine — small intestine and large intestine.
Digestion and absorption of Carbohydrates, Proteins, Fats, Lipids.

3. Respiratory system
Functions of Respiratory system, Physiological Anatomy of Respiratory system, Respiratory tract,
Respiratory Muscles, Respiratory organ-lungs, Alveoli, Respiratory membrane, stages of respiration.
Mechanism of normal intra pulmonary / pleural pressure, surfactant.

Applied Physiology and Respiration : Hypoxia, Cyanosis, Asphyxia, Dyspnea, Dysbarism, Artificial Respiration, Apnoea.

4. Endocrine System —
Thyroid gland hormone — Physiological function, regulation of secretion. Disorders — hypo and hyper secretion of hormone with features.

**Adrenal gland** — Physiological functions of hormones secreted, hypo & hyper secretion of hormones with features.

Pituitary hormones — Anterior and posterior pituitary hormones, function.


Parathyroid gland — function, action, regulation of secretion of parathyroid hormone. Calcitonin — function and action

**5. Special senses**

Vision — structure of eye. Function of different parts.

Structure of retina, Optic pathway, Refractive errors of eye.

Hearing structure and mechanism of hearing

Functions of middle ear.

Taste — Taste buds functions.

Smell physiology, Receptors.

**6. Nervous system**

Functions of Nervous system, Neuron structure, classification & properties. Neuroglia, conduction of impulses continuous and salutatory and factors affecting. Synapse — structure, types, properties.


Pyramidal tracts — Extrapyramidal tracts. Functions of Hypothalamic, disorders. Cerebral cortex lobes and functions, Sensory cortex, Motor cortex, functions of Cerebellum. Basal ganglion-functions. EEG.

Cerebro Spinal Fluid(CSF) : formation, circulation, properties, composition and functions

lumbar puncture.

Autonomic Nervous System: Sympathetic and parasympathetic distribution and functions and comparison of functions.

**7. Excretory System**

Excretory organs

Kidneys: Functions of kidneys structural and functional unit nephron, vasarecta, cortical and juxtamedullary nephrons — Comparison, Juxta Glomerular Apparatus — Structure and function.

Properties and composition of normal urine, urine output. Abnormal constituents in urine. Mechanism of urine concentration — Current Mechanisms


8. Reproductive system

Function of Reproductive system, Puberty

Male reproductive system- Functions of testes, spermatogenesis site.

Androgens — Testosterone and functions.

Female reproductive system, Functions of estrogen & progesterone, Ovulation, menstrual cycle, pregnancy test.

9. Muscle nerve physiology


10. Skin — Functions of skin

Body temperature measurement, Regulation of body Temperature by physical chemical and nervous mechanisms. Role of Hypothalamus, Hypothermia

PRACTICALS – ONLY DEMONSTRATION

1. Haemoglobinometry
2. White Blood Cell count
3. Red Blood Cell count
4. Determination of Blood Groups
5. Leishman’s staining and Differential WBC count
6. Determination of packed cell Volume
7. Erythrocyte sedimentation rate [ESR]
8. Calculation of Blood indices
9. Determination of Clotting Time, Bleeding Time
10. Blood pressure Recording
11. Auscultation for Heart Sounds
12. Artificial Respiration
13. 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.

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REFERENCE BOOKS:

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
A K Jain MLT Venkatesh Sudakar
BIOCHEMISTRY

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

Theory:

Specimen collection: Pre-analytical variables
Collection of blood
Collection of CSF & other fluids
Urine collection
Use of preservatives
Anticoagulants

1. Introduction to Laboratory apparatus

Pipettes- different types (Graduated, volumetric, Pasteur, Automatic etc.,)
Calibration of glass pipettes
Burettes, Beakers, Petri dishes, depression plates.
Flasks - different types )Volumetric, round bottmed, Erlemeyer conical etc.,)
Funnels – different types (Conical, Buchner etcx.,)
Bottles – Reagent bottles – graduated and common, Wash bottles – different type
Specimen bottles etc.,

2. 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 holders Racks – Bottle, Test tube, Pipette
Dessicator, Stop watch, rimers, scissors
Dispensers – reagent and sample

Any other apparatus which is important and may have been missed should also be covered

Maintenance of lab glass ware and apparatus:
Glass and plastic ware in Laboratory

*use of glass: significance of boro silicate glass ; care and cleaning of glass ware, different cleaning solutions of glass
* care and cleaning of plastic ware, different cleaning solutions

3. Instruments (Theory and demonstration) Diagrams to be drawn

Water bath: Use, care and maintenance

Oven & Incubators : Use, care and maintenance.

Water Distilation plant and water deionisers. Use, care and maintenance

Refrigerators, cold box, deep freezers – Use, care and maintenance

Reflux condenser : Use, care and maintenance

Centrifuges (Theory and demonstration) Diagrams to be drawn

Definition, Principle, svedberg unit, centrifugal force, centrifugal field rpm, rcf. Conversion of G to rpm and vice versa.

Different types of centrifuges

Use care and maintenance of a centrifuge

Laboratory balances [Theory & Practicals) Diagrams to be drawn

Manual balances: Single pan, double pan, trip balance

Direct read out electrical balances.

Use care and maintenance. Guideline to be followed and precautions to be taken while weighing

Weighing different types of chemicals, liquids. Hygroscopic compounds etc.

Colorimeter and spectrophotometer (Theory and Practicals) Diagrams to be drawn

Principle, Parts Diagram.

Use, care and maintenance.

pH meter (Theory & practicals) Diagrams to be drawn

principle, parts, Types of electrodes, salt bridge solution.

Use, care and maintenance of Ph meter and electrodes

Guidelines to be followed and precautions to be taken while using pH meter

4. Safety of measurements
5. Conventional and SI units

6. Atomic structure

Dalton’s theory, Properties of electrons, protons, neutrons, and nucleus, Rutherford’s model of atomic structure, Bohr’s model of atomic structure, orbit and orbital, Quantum numbers, Heisenberg’s uncertainly principle.

Electronic configuration – Aufbau principle, Pauli’s exclusion principle, etc.,

Valency and bonds – different types of strong and weak bonds in detail with examples

Theory & Practicals for all the following under this section

Molecular weight, equivalent weight of elements and compounds, normality molarity

Preparation of molar solutions (mole/litre solution) eg: 1 M Nacl, 0.15 M NaCL
1 M NaOH, 0.1 M HCl, 0.1 M H 2S04 etc.,

Preparation of normal solutions. eg., 1N Na2CO3, 0 IN Oxalic acid, 0.1 N HCl, 0.1N H2S04, 0.66 N H2S04 etc.,

Percent solutions. Preparation of different solutions – v/v w/v (solids, liquids and acids)

Conversion of a percent solution into a molar solution

**Dilutions**

Diluting solutions: eg. Preparation of 0.1 N NaCl from 1 N NaCl from 2 NHCl etc.,

Preparing working standard from stock standard, Body fluid dilutions, Reagent dilution techniques, calculating the dilution of a solution, body fluid reagent etc.,

**Saturated and supersaturated solutions.**

Standard 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 (CaCl2, potassium carbonate, sodium hydroxide etc.,)

Preparation of standards using conventional and SI units

**Acids, bases, salts and indicators.**

Acids and Bases: Definition, physical and chemical properties with examples. Arreheinies concept of acids and bases, Lowery – Bronsted theory of acids and bases classification of acids and bases. Different between bases and alkali, acidity and basicity, monoprotonic
and polyprotonic 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

**Acid- base indicators: (Theory and Practicals)**

Theory – Definition, concept, mechanism of dissociation of an indicator, colour change of an indicator in acidic and basic conditions, use if 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 and 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

**Quality control:**

Accuracy

Precision

Specificity

Sensitivity

Limits of error allowable in laboratory

Percentage error

Normal values and Interpretations

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 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

Internal Assessment

Theory - Average of two exams conducted 20
Practicals: Record & 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 Biochemistry shall

be as given under.

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Text Book References

- Biochemistry –by U Sathyanarayana & U Chakrapani
- Textbook of Medical Biochemistry by D.M Vasudeva & Shrrekumari.
- Textbook of Medical Biochemistry- by MN Chatterjea & Rana Shinde
- Textbook of Medical Laboratory technology by Godkar and Godkar.
- Biochemistry- by Pankaja Naik
- Medical Laboratory technology by Ramnik Sood.
- Manipal Manual of Clinical Biochemistry for medical laboratory and M.Sc., students- by Shivananda Nayak B
- Varley’s Practical Clinical Biochemistry,
PATHOLOGY

Histo Pathology ,Clinical Pathology, Haematology and Blood Banking

Theory – 70 hours
Practical – 20 hours

THEORY

HistoPathology -
- Introduction to Histo Pathology
- Receiving of Specimen in the laboratory
- Grossing Techniques
- Mounting Techniques – various Mountants
- Maintenance of records and filing of the slides.
- Use & care of Microscope
- Various Fixatives, Mode of action, Preparation and Indication.
- Bio-Medical waste management
- Section Cutting
- Tissue processing for routine paraffin sections
- Decalcification of Tissues.
- Staining of tissues - H& E Staining
- Bio-Medical waste management

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 cerebro spinal fluid (CSF)
- Sputum Examination.
- Examination of feces

**Haematology** –

- Introduction to Haematology
- Normal constituents of Blood, their structure and function.
- Collection of Blood samples
- Various Anticoagulants used in Haematology
- Various instruments and glassware used in Haematology, 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.

**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.

**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 Pathology I shall be as given under.

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**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
Microbiology I

Theory: 70 Hours
Practicals: 20 Hours

Objective: This course introduces the principles of Microbiology with emphasis on applied aspects of Microbiology of infectious diseases particularly in the following areas:

- Principles & practice of sterilization methods.
- Collection and despatch of specimens for routine microbiological investigations.
- Interpretation of commonly done bacteriological and serological investigations.
- Control of Hospital infections
- Biomedical waste management
- Immunization schedule

Theory - 70 hours

1. **Morphology 4 hours**
   
   Classification of microorganisms, size, shape and structure of bacteria. Use of microscope in the study of bacteria.

2. **Growth and nutrition 4 hours**
   
   Nutrition, growth and multiplications of bacteria, use of culture media in diagnostic bacteriology.

3. **Sterilisation and Disinfection 4 hours**
   
   Principles and use of equipments of sterilization namely Hot Air oven, Autoclave and serum inspissrator. Pasteurization, Anti septic and disinfectants.
   
   Antimicrobial sensitivity test

4. **Immunology 6 hours**
   
   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 20 hours**
   
   Morphology, cultivation, diseases caused laboratory diagnosis including specimen collection of the following bacteria (the classification, antigenic
structure and pathogenicity are not to be taught)
Staphylocci, Streptococci, Pneumococci, Gonococci, Menigococci, C
diphtheriae, Mycobacteria, Clostridia, Bacillus, Shigella, Salmonella, Esch coli,
Klebsiella, Proteus,vibrio cholerae, Pseudomonas & Spirochetes

6. Parasitology 10 hours
Morphology, life cycle, laboratory diagnosis of following parasites
E. histolytica, Plasmodium, Tape worms, Intestinal nematodes

7. Mycology 4 hours
Morphology, diseases caused and lab diagnosis of following fungi.
Candida, Cryptococcus, Dermatophytes ,opportunistic fungi.

8. Virology 10 hours
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. 4 hours

10. Principles and practice Biomedical waste management 4 hours

PRACTICAL 20 HOURS
Compound Microscope.
Demonstration and sterilization of equipments – Hot Air oven, Autoclave, Bacterial filters.
Demonstration of commonly used culture media, Nutrient broth, Nutrient agar, Blood agar,
Choclate 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, VRDL, ELISA.
Grams stain
Acid Fast staining
Stool exam for Helminthic ova
Visit to hospital for demonstration of Biomedical waste management
Anaerobic culture methods.

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

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2. Robert Cruckshank- 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


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**

2. Wren and Martin - Grammar and Composition, 1989, Chanda & Co, Delhi
5. Journalism Made Simple D Wainwright
6. Writers Basic Bookself Series, Writers Digest series
7. Interviewing by Joan Clayton Platkon

**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.

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**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**


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%

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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, Ureter, Urethra, Prostate
Histology of Kidney
Blood Supply of Kidney
Development of Kidney in Brief
Anatomy of Peritoneum Including Concept of Abdominal Hernias
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 & 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, Cogulation Factors, Auto Regulation, Bt, Ct, Pt, Ptt, Thrombin Time
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.

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NO PRACTICAL EXAMINATION
PHARMOCOLOGY 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 hypotention
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 PHARMOCOLOGY RELATED TO HAEMO & PERITONEAL DIALYSIS PAPER II shall be as given under.

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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

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NO PRACTICAL EXAMINATION

APPLIED ASPECTS OF PAHTOLOGY & MICROBIOLOGY PAPER IV

Pathology 50 marks

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

Microbiology

1. Hepatotrophic 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, jugula, subclavian catheters)
6. Sampling methodologies for culture & sensitivity

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

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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

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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 blood 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 Amyloidisis
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 the Applied Dialysis Technology paper shall be as given under.

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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.

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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/a v 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. Medical ethics & the relevant 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