Revised Ordinance Governing Regulations and Curriculum

of

B.Sc. PERFUSION 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 Hermes 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 Kamebh 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. Perfusion 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.Perfusion 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. Perfusion 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 Perfusion 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 Perfusion technology should have studied Physics, Biology and Chemistry as subjects during the tenure of the course.

   OR

6. Lateral entry to second year of B.Sc. Perfusion 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. Perfusion Technology

Theory - 20 marks

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

2nd & 3rd year B.Sc. Perfusion Technology
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 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>
<thead>
<tr>
<th>Table - I Distribution of Teaching Hours in First Year Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main subjects</strong></td>
</tr>
<tr>
<td>Sl. no</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>Total</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**

Sociology 20 Hours
English 25 Hours
Biostatistics 20 Hours
Indian constitution
Environment science and health
Basics in computer applications

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 PHARMACOLOGY</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>APPLIED PATHOLOGY</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>APPLIED MICROBIOLOGY</td>
<td>40</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>MEDICINE RELEVANT TO PERFUSION TECHNOLOGY</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>INTRODUCTION TO PERFUSION TECHNOLOGY</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table - III Distribution of Teaching Hours in Third Year Subjects

Main Subjects

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Subjects</th>
<th>Theory 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>Paper-I Perfusion Technology Clinical</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Paper-II Perfusion Technology – Applied</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Paper-III Perfusion Technology – Advanced</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>Main Subjects</th>
<th>Written Paper</th>
<th>I A Theory</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Duration</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>
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<td>20</td>
</tr>
<tr>
<td></td>
<td>Subsidiary Subject**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>English</td>
<td>3 Hours</td>
<td>80</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>Kannada</td>
<td>3 Hours</td>
<td>80</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>Health Care</td>
<td>3 Hours</td>
<td>80</td>
<td>20</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. Perfusion Technology**

<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</td>
</tr>
<tr>
<td>I</td>
<td>APPLIED PHARMACOLOGY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>APPLIED PATHOLOGY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>APPLIED MICROBIOLOGY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>MEDICINE RELEVANT TO PERFUSION TECHNOLOGY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>INTRODUCTION TO PERFUSION TECHNOLOGY</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TABLE – VI**

**Distribution of Subjects and marks for Third Year Examination of B.Sc. Perfusion Technology**

<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>Paper-I Perfusion Technology Clinical</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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><strong>Type of Questions</strong></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><strong>Type of Questions</strong></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><strong>Type of Questions</strong></td>
</tr>
<tr>
<td>Essay Type</td>
</tr>
<tr>
<td>Short Essay Type</td>
</tr>
<tr>
<td>Short Answer Type</td>
</tr>
</tbody>
</table>
SUBJECTS HAVING MAXIMUM MARKS= 60

<table>
<thead>
<tr>
<th>Type of Questions</th>
<th>No. of Questions</th>
<th>Marks for Each Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Essay Type</td>
<td>3 (2 x 10)</td>
<td>10</td>
</tr>
<tr>
<td>Short Essay Type</td>
<td>7 (5 x 5)</td>
<td>05</td>
</tr>
<tr>
<td>Short Answer Type</td>
<td>7 (5 x 3)</td>
<td>03</td>
</tr>
</tbody>
</table>

SUBJECTS HAVING MAXIMUM MARKS= 50

<table>
<thead>
<tr>
<th>Type of Questions</th>
<th>No. of Questions</th>
<th>Marks for Each Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Essay Type</td>
<td>3 (2 x 10)</td>
<td>10</td>
</tr>
<tr>
<td>Short Essay Type</td>
<td>5 (3 x 5)</td>
<td>05</td>
</tr>
<tr>
<td>Short Answer Type</td>
<td>7 (5 x 3)</td>
<td>03</td>
</tr>
</tbody>
</table>

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
Practical: demonstration of parts of urinary system
Histology of kidney, ureter, urinary bladder
Radiographs of abdomen-IVP, retrograde cystogram

8. Reproductive system
Theory:
Parts of male reproductive system, testis, vas deferens, epididymis, prostate (gross & histology)
Parts of female reproductive system, uterus, fallopian tubes, ovary (gross & histology)
Mammary gland – gross
Practical: demonstration of section of male and female pelvis with organs in situ
Histology of testis, vas deferens, epididymis, prostate, 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 glad – (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
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.

<table>
<thead>
<tr>
<th>TYPE OF QUESTION</th>
<th>NUMBER OF QUESTIONS</th>
<th>MARKS</th>
<th>SUB-TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short essay type</td>
<td>10 (attempt 8)</td>
<td>8 x 5</td>
<td>40</td>
</tr>
<tr>
<td>Short answer type</td>
<td>12 (attempt 10)</td>
<td>10 x 3</td>
<td>30</td>
</tr>
<tr>
<td>To the point answer</td>
<td>07 (attempt 5)</td>
<td>5 x 2</td>
<td>10</td>
</tr>
<tr>
<td><strong>GRAND TOTAL</strong></td>
<td></td>
<td></td>
<td><strong>80</strong></td>
</tr>
</tbody>
</table>

Distribution of Marks for University Theory and Practical Exam

<table>
<thead>
<tr>
<th>Theory</th>
<th>Viva Voce</th>
<th>IA</th>
<th>Sub Total</th>
<th>Practicals</th>
<th>IA</th>
<th>Sub Total</th>
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<tbody>
<tr>
<td>80</td>
<td>-</td>
<td>20</td>
<td>100</td>
<td>*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Grand total 100

REFERENCE BOOKS:
1. William Davis (P) understanding Human Anatomy and Physiology – McGraw Hill
2. Chaursia- 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. Grischemer- 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

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: 70hours
No. of practical classes: 20 hours

THEORY

Carbohydrates
Glucose and Glycogen Metabolism

Proteins:
Classification of proteins and functions

Lipids:
Classification of lipids and functions

Enzymes:
Definition – Nomenclature – Classification – Factors affecting enzyme activity – Active site – Coenzyme – Enzyme Inhibition – Units of enzyme – Isoenzymes – Enzyme pattern in diseases.

Vitamins & Minerals:
Fat soluble vitamins(A,D,E,K) – Water soluble vitamins – B-complex vitamins- principal elements(Calcium, Phosphorus, Magnesium, Sodium, Potassium, Chlorine and sulphur) - Trace elements – Calorific value of foods – Basal metabolic rate(BMR) – respiratory quotient(RQ) Specific dynamic action(SDA) – Balanced diet – Marasmus – Kwaisirkar

Acids and bases:
Definition, pH, Henderson – Hasselbalch equation, Buffers, Indicators,
Normality, Molarity, Molality

Serum electrolytes

PRACTICALS

1 Benedict’s test
2. Heat coagulation tests

Specimen collection: Pre-analytical variables

Collection of blood

Collection of CSF & other fluids

Urine collection

Use of preservatives

Anticoagulants

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 etc.,)

Bottles – Reagent bottles – graduated and common, Wash bottles – different type Specimen bottles etc.,

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 Distillation 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, ref. 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 H2SO4 etc.,

preparation of normal solutions. eg., IN Na2CO3, O IN Oxalic acid, 0.1 N HCl, 0.1N H2504, 0.66 N H2SO4 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. Arrehenius 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 idicator, colour change of an indicator in acidic and basic conditions, use if standard buffer solution and indicators for Ph determinations, preparatin 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 soslution . 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

4. Estimation of Blood sugar, Blood Urea and electrolytes

5. 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**
PATHOLOGY

Histo Pathology, Clinical Pathology, Haematology and Blood Banking
Theory – 70 hours

Practical – 20 hours

PATHOLOGY

THEORY

1. Cellular adaptation, Cell injury & cell death
   Introduction to pathology.
   Overview: Cellular response to stress and noxious stimuli.
   Cellular adaptations of growth and differentiation.
   Overview of cell injury and cell death.
   Causes of cell injury.
   Mechanisms of cell injury.
   Reversible and irreversible cell injury.
   Examples of cell injury and necrosis

2. Inflammation
   General features of inflammation
   Historical highlights
   Acute inflammation
   Chemical mediators of inflammation
   Outcomes of acute inflammation
   Morphologic patterns of acute inflammation
   Summary of acute inflammation
   Chronic inflammation

3. Immunity disorders
   General features of the immune system
   Disorders of the immune system

4. Infectious diseases
   General principles of microbial pathogenesis
   Viral infections
   Bacterial infections-Rheumatic heart disease.
   Fungal infections
   Parasitic infections
HistoPathology - Theory
- 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
- Introduction to Clinical Pathology
- Collection, Transport, Preservation, and Processing of various clinical specimens
- Urine Examination – Collection and Preservation of urine.
- Examination of body fluids.
- Examination of cerebro spinal fluid (CSF)
- Sputum Examination.
- Examination of feces

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

- Histopathlogy – Section cutting and H &E Staining.[For BSc MLT only ]

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 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

Microbiology

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.

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 aught)
   Staphyloccci, 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,
    Chocolate agar, Mac conkey medium, LJ media, Robertson Cooked meat media, Potassium
    tellurite media with growth, Mac with LF & NLF, NA with staph Antibiotic susceptibility
    test
    Demonstration of common serological tests – Widal, 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 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.

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.

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Reference Books-
1. Ananthanarayana & Panikar Medical Microbiology- University Press
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

Syllabus for First year Allied Health science courses RGUHS

B.Sc. Perfusion Technology

SUBSIDIARY SUBJECTS

SOCIOLOGY

Teaching Hours : 20

Course Description

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

**Meaning** – Definition and scope of sociology

Its relation to Anthropology, Psychology, Social Psychology

**Methods of Sociological investigations** – Case study, social survey, questionnaire, interview and opinion poll methods.

Importance of its study with special reference to health care professionals

Social Factors in Health and Disease:

Meaning of social factors

Role of social factors in health and disease

**Socialization:**

Meaning and nature of socialization

Primary, Secondary and Anticipatory socialization

Agencies of socialization

**Social Groups:**

1. Concepts of social groups, influence of formal and informal groups on health and sickness. The role of primary groups and secondary groups in the hospital and rehabilitation setup.

2.

**Family:**

The family, meaning and definitions

Functions of types of family

Changing family patterns

Influence of family on individual’s health, family and nutrition, the effects of sickness in the family and psychosomatic disease and their importance to physiotherapy

**Community:**

Rural community: Meaning and features – Health hazards to rural communities, health hazards to tribal community.

Urban community – Meaning and features – Health hazards of urbanities

**Culture and Health:**
Concept of Health
Concept of culture
Culture and Health
Culture and Health Disorders

Social Change:

Meaning of social changes
Factors of social changes
Human adaptation and social change
Social change and stress
Social change and deviance
Social change and health programme
The role of social planning in the improvement of health and rehabilitation

Social Problems of disabled:
Consequences of the following social problems in relation to sickness and disability remedies to prevent these problems
Population explosion
Poverty and unemployment
Beggary
Juvenile delinquency
Prostitution
Alcoholism
Problems of women in employment

Social Security:

Social Security and social legislation in relation to the disabled
Social Work :
Meaning of Social Work
The role of a Medical Social Worker

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
BIO STATISTICS

Time Allotted: 20 Hours

Course Description:
Introduction to basic statistical concepts: methods of statistical analysis; and interpretation of data

Behavioural Objectives:
Understands statistical terms.
Possesses knowledge and skill in the use of basic statistical and research methodology.

Unit – I : Introduction
Meaning, definition, characteristics of statistics.
Importance of the study of statistics.
Branches of statistics.
Statistics and health science including nursing.
Parameters and estimates.

Descriptive and inferential statistics.
Variables and their types.
Measurement scales

Unit – II : Tabulation of Data
Raw data, the array, frequency distribution.
Basic principles of graphical representation.
Types of diagrams - histograms, frequency polygons, smooth frequency polygon, commulative
frequency curve, ogive.
Normal probability curve.

Unit - III : Measure of Central Tendency

Need for measures of central tendency
Definition and calculation of mean - ungrouped and grouped
Meaning, interpretation and calculation of median ungrouped and grouped.
Meaning and calculation of mode.
Comparison of the mean, and mode.
Guidelines for the use of various measures of central tendency.

Unit - IV : Measure of Variability

Need for measure of dispersion.
The range, the average deviation.
The variance and standard deviation.
Calculation of variance and standard deviation ungrouped and grouped.
Properties and uses of variance and SO

Unit -V : Probability and Standard Distributions.

Meaning of probability of standard distribution.
The Binominal distribution.
The normal distribution.
Divergence from normality - skewness, kurtosis.
Sampling Techniques - Criteria for good samples.
Application of sampling in Community.
Procedures of sampling and sampling designs errors.
Sampling variation and tests of significance.
Unit - VII : Health Indicator

Importance of health Indicator.

Indicators of population, morbidity, mortality, health services.

Calculation of rates and rations of health.

Recommended Books.

Jaypee Broth
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**


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%

**INDIAN CONSTITUTION**

Prescribed for the First Year students of all degree classes

Unit-I: Meaning of the team ‘Constitution’ making of the Indian Constitution 1946-1940.

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

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


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

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

Unit – VIII: Method of amending the Constitution.

Unit – IX: Enforcing rights through Writs:

Unit – X: Constitution and Sustainable Development in India.

Books:


ENVIRONMENT SCIENCE AND HEALTH

Introduction to Environment and Health
Sources, health hazards and control of environmental pollution Water
The concept of safe and wholesome water.
The requirements of sanitary sources of water.
Understanding the methods of purification of water on small scale and large scale.
Various biological standards, including WHO guidelines for third world countries.
Concept and methods for assessing quality of water.
Domestic refuse, sullage, human excreta and sewage their effects on environment and health, methods and issues related to their disposal.

Awareness of standards of housing and the effect of poor housing on health.

Role of arthropods in the causation of diseases, mode of transmission of arthropods borne diseases, methods of control

Recommended Books.


**BASICS IN COMPUTER APPLICATIONS**

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

**Introduction to Data processing :**

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

**Hardware Concepts :**


Concept of Software.


Basic Anatomy of Computers

Principles of programming

Computer application - principles in scientific research ; work processing, medicine, libraries, museum , education, information system.
Data processing
Computers in physical therapy - principles in EMG, Exercise testing equipment, Laser.

**SCHEME OF EXAMINATION FOR MEDICAL ELECTRONICS INCLUDING COMPUTER APPLICATIONS**

One Written (Theory) paper: Maximum Marks: –80 marks.
No Practical or Viva voce examination

**SECOND YEAR B.SC  PERFUSION TECHNOLOGY**

Syllabus for Second year Allied Health science courses        RGUHS
B.Sc. Perfusion Technology

**APPLIED PHARMACOLOGY**

• General concepts about pharmacodynamic and Pharmacokinetic Principles involved in drug activity.

I. Autonomic nerves system.
• Anatomy & functional organisation.
• List of drugs acting an ANS including dose, route of administration, indications, contra indications and adverse effects.

II. Cardiovascular drugs- Enumerate the mode of action, side effects And therapeutic uses of the following drugs.
   a. Antihypertensives
   • Beta Adrenergic antagonists
   • Alpha Adrenergic antagonists
   • Peripheral Vasodilators
• Calcium channel blockers

b. Antiarrhythmic drugs

c. Cardiac glycosides

d. Sympathetic and nonsympathetic inotropic agents.

e. Coronary vasodilators.

f. Antianginal and anti failure agents

g. Lipid lowering & anti atherosclerotic drugs.

h. Drugs used in Haemostais – anticoagulants Thrombolytics and antithrombolytics.

i. Cardioplegic drugs- History, Principles and types of cardioplagia.

j. Primary solutions – History, principles & types.

k. Drugs used in the treatment of shock.

III. Anaesthetic agents.

• Definition of general and local anaesthetics.

• Classification of general anaesthetics.

• Pharmacokinetics and Pharmacodynamics of inhaled anaesthetic agents.
• Intravenous general anaesthetic agents.
• Local anaesthetics – classification mechanism of action, duration of action and methods to prolong the duration of action. Preparation, dose and routes of administration.

IV Analgesics
• Definition and classification
• Routes of administration, dose, frequency of administration, Side effects and management of non opioid and opioid analgesics

V. Antihistamines and antiemetics-
• Classification, Mechanism of action, adverse effects, Preparations, dose and routes and administration.

VI. CNS stimulants and depressants
• Alcohol
• Sedatives, hypnotics and narcotics
• CNS stimulants
• Neuromuscular blocking agents and muscle relaxants.

VII. Pharmacological protection of organs during CPB

VIII. Inhalational gases and emergency drugs.

IX. Pharmacotherapy of respiratory disorders

     Introduction – Modulators of bronchial smooth muscle tone and pulmonary vascular smooth muscle tone
     Pharmacotherapy of bronchial asthma
Pharmacotherapy of cough
Mucokinetic and mucolytic agents
Use of bland aerosols in respiratory care.

X. Corticosteroids – Classification, mechanism of action, adverse effects and complications. Preparation, dose and routes of administration.

XI. Diuretics
• Renal physiology
• Side of action of diuretics
• Adverse effects
• Preparations, dose and routes of administration.

XII. Chemotherapy of infections
• Definition
• Classification and mechanism of action of antimicrobial agents
• Combination of antimicrobial agents
• Chemoperophylaxis.
• Classification, spectrum of activity, dose, routes of administration and adverse effects of penicillin, cephalosporins, aminoglycosides, tetracyclines, chloramphenicol, antitubercular drugs.

XIII. Miscellaneous.
• IV fluids- various preparations and their usage.

• Electrolyte supplements
• Immunosuppressive agents
• New drugs included in perfusion technology.
• Drugs used in metabolic and electrolyte imbalance.
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

Syllabus for Second year Allied Health science courses  RGUHS

B.Sc. Perfusion Technology

APPLIED PATHOLOGY

I. CARDIOVASCULAR SYSTEM

• Atherosclerosis - Definition, risk factors, briefly Pathogenesis & morphology, clinical significance and prevention.

• Hypertension - Definition, types and briefly Pathogenesis and effects of Hypertension.

• Aneurysms – Definition, classification, Pathology and complications.

• Pathophysiology of Heart failure.

• Cardiac hypertrophy – causes, Pathophysiology & Progression to Heart Failure.

• Ischaemic heart diseases - Definition, Types. Briefly Pathophysiology, Pathology & Complications of various types of IHD.

• Valvular Heart diseases- causes, Pathology & complication. Complications of artificial valves.

• Cardiomyopathy – Definition, Types, causes and significance.

• Pericardial effusion - causes, effects and diagnosis.

• Congenital heart diseases – Basic defect and effects of important types of congenital heart diseases.

II. HAEMATOLOGY

• Anaemia – Definition, morphological types and diagnosis of anaemia.
Brief concept about Haemolytic anaemia and polycythaemia.

- Leukocyte disorders- Briefly leukaemia, leukocytosis, agranulocytosis etc.,

- Bleeding disorders- Definition, classification, causes & effects of important types of bleeding disorders. Briefly various laboratory tests used to diagnose bleeding disorders.

III. RESPIRATORY SYSTEM

- Chronic obstructive airway diseases – Definition and types. Briefly causes, Pathology and complications of each type of COPD.

- Briefly concept about obstructive versus restrictive pulmonary disease.

- Pneumoconiosis- Definition, types, Pathology and effects in brief.

- Pulmonary congestion and edema.

- Pleural effusion – causes, effects and diagnosis.

IV. RENAL SYSTEM

- Clinical manifestations of renal diseases. Briefly causes, mechanism, effects and laboratory diagnosis of ARF & CRS. Briefly Glomerulonephritis and Pyelonephritis.

- End stage renal disease – Definition, causes, effects and role of dialysis and renal transplantation in its management.

- Brief concept about obstructive uropathy.

V. Introduction to Oncology (or Cancer Physiology):
- Oncology Terminologies and types
- Physiology of Cancer
- Diagnosis and Staging of Cancer
- Cancer Therapy - a) Chemotherapy  b) Radiation c) Surgery
- Role of HIPEC (Hyperthermic Intra Peritoneal Chemo therapy) and Isolated Limb Perfusion in cancer therapy
- Role of Perfusionist in HIPEC and Isolated Limb Perfusion

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
Syllabus for Second year Allied Health science courses RGUHS

B.Sc. Perfusion Technology

APPLIED MICROBIOLOGY

THEORY – 40 HOURS

1. Health care associated infections and Antimicrobial resistance: Infections that patients acquire during the course of receiving treatment for other conditions within a healthcare setting like Methicillin Resistant Staphylococcus aureus infections, Infections caused by Clostridium difficile, Vancomycin resistant enterococci etc. Catheter related blood stream infections, Ventilator associated pneumonia, Catheter Related urinary tract infections, Surveillance of emerging resistance and changing flora. The impact and cost attributed to Hospital Associated infection.

6 Hours

2. Disease communicable to Healthcare workers in hospital set up and its preventive measure: Occupationally acquired infections in healthcare professionals by respiratory route ( tuberculosis, varicella-zoster, respiratory syncytial virus etc ), blood borne transmission ( HIV, Hepatitis B, Hepatitis C, Cytomegalovirus, Ebola virus etc), oro faecal route ( Salmonella, Hepatitis A etc), direct contact ( Herpes Simplex Virus etc). H1N1 INFLUENZA

Preventive measures to combat the spread of these infections by monitoring and control. 6 Hours

3. Microbiological surveillance and sampling: Required to determine the frequency of potential bacterial pathogens including Streptococcus pneumoniae, Haemophilus influenzae, and Moraxella catarrhalis and also to assess the antimicrobial resistance.

Sampling: rinse technique, direct surface agar plating technique. 6 Hours

4. Importance of sterilization:

a. Disinfection of instruments used in patient care: Classification, different methods, advantages and disadvantages of the various methods.

b. Disinfection of the patient care unit

c. Infection control measures for ICU’s 10 Hours

5. Sterilization:

a. Rooms: Gaseous sterilization, one atmosphere uniform glow discharge plasma (OAUGDP).

b. Equipments: classification of the instruments and appropriate methods of sterilization.
c. Central supply department: the four areas and the floor plan for instrument cleaning, high-level disinfecting and sterilizing areas. 8 Hours

6. Preparation of materials for autoclaving: Packing of different types of materials, loading, holding time and unloading. 4 Hours

PRACTICALS- 30 HOURS


2. Collection of specimen from outpatient units, inpatient units, minor operation theater and major operation theater for sterility testing.

3. The various methods employed for sterility testing.

4. Interpretation of results of sterility testing.

5. Disinfection of wards, OT and Laboratory.

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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Syllabus for Second year Allied Health science courses  
RGUHS  
B.Sc. Perfusion Technology  
MEDICINE RELEVANT TO PERFUSION TECHNOLOGY  
Cardiovascular System  
Ischaemic heart diseases  
Rheumatic heart disease  
Congenital heart disease
Hypertension
Aortic Aneurysms
Cardiomyopathy
Peripheral vascular disease
Pulmonary edema and LV failure
Hematology
Anaemia
Bleeding disorders
Laboratory tests used to diagnose bleeding disorders (in brief)
Respiratory System
Chronic obstructive airway diseases (COPD)
Concept of obstructive versus restrictive pulmonary disease PFT and its interpretation
Renal System
ARF & CRF
End stage renal disease
Role of dialysis and renal transplantation in its management
CNS
Automatic nervous system
(Sympathetic & Parasympathetic system)
Brief mention of CNS disorders & their etiology
Others
DM
Obesity
Pregnancy
Paediatric Patient (neonate/Infant)
Elderly patient
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

Syllabus for Second year Allied Health science courses  
B.Sc. Perfusion Technology

INTRODUCTION TO PERFUSION TECHNOLOGY

Basics of diagnostic techniques:

- Chest of X-ray
- ECG
- Echo
- Angiography
- Nuclear Cardiology
- Laboratory investigations in relation to perfusion technology
- Cardiopulmonary bypass and perfusion technology
- History of Cardiac surgery and perfusion
  - Specific reference of Gibbon Lillehei, carrel
• Pre CPB surgery

• Azygous Flow principle.

• Hypothermic/nonhypothermic non-CPB surgery including gross’s Well technique and controlled cross circulation.

Monitoring and instrumentation

Concepts of monitoring – instrumentation technology of ECG machine, pressure transducer, syringe and peristaltic pumps, monitors, ventilators, pulse oximeters, temperature probes and thermo regulatory monitoring, defibrillators and fibrillators. Piped and non-piped gas delivery systems and connections. Basic physics related to medically used gases.

Hemodynamic monitoring

Haemostatic monitoring

Hematologic monitoring
  Maintenance of oxygen, carbon dioxide and acid-base status and their monitoring
  Neurological monitoring (NIRS, SSPE, EEG and cerebral function monitor)

Online monitoring devices for CPB

Basics of Data Management Systems

Aseptic technique.

Cardiac surgery team, profession and terminology, scope of perfusion technology

Physiology of Extracorporeal circulation

Heart – Lung machine

• Principles of extracorporeal circulation

• Materials used in EC circuit

• Principles of extracorporeal gas exchange

Heat Exchanger Principle:
Methods to clean and maintain different Heat exchangers
Heat exchangers & Mycobacterium chimera Outbreak – methodologies for preventing

Various types of oxygenators

• Bubble oxygenators

• Rotating spiral/cylinder/disc oxygenators

• Membrane oxygenators
• Mechanism of action components defoaming, rated flow.

Theory of blood pumps

• Ideal blood pump, pulsatile versus non-pulsatile flow, occlusive and non-occlusive pumps, various types of pumps roller, bellow, sigmamotor, diaphragm, ventricular and centrifugal pumps.

Element of extracorporeal circulation
Basic Failure of extracorporeal devices and its management

Connection of the vascular system with extracorporeal circulation:

• Arterial and venous cannulae.
• Connecting tubes and connectors
• Vents
• Suckers
• Cardioplegia delivery system
• Venous drainage.

Haemodynamic of arterial return, venous drainage, cardioplegia Delivery and venting.


Syllabus for Third year Allied Health science courses RGUHS

B.Sc  Perfusion Technology

Paper-I Perfusion Technology Clinical

1. Pharmacokinetics and Pharmacodynamics of Cardiopulmonary bypass
2. Drugs (including anesthetic drugs) used in cardiopulmonary bypass
3. Conduct and monitoring of Cardiopulmonary bypass
4. Adequacy of perfusion – General considerations, specific aspects of perfusion, monitoring, other concomitants which may affect its adequacy
5. Goal Directed Perfusion Its Significance – How it works – calculations for GDP (DO2, VO2, its indexes, its ratios, how to handle the patients with abnormal values)
6. Pulsatile perfusion – Introduction, theory & physiology of pulsatile flow, hemodynamic, metabolic effects, Clinical use, hematological effects
7. Cannulation techniques during cardiopulmonary bypass -Complications of different types of cannulations, cannulation strategy when switching from CPB to ECLS and vice versa.
7. Termination of cardiopulmonary bypass – principles and methodology
8. Myocardial protection and cardioplegia - Physiology and mechanism of action - pretreatment of the Myocardium, Types of cardioplegia – Blood Crystalloid, Delnido, Custodial hypothermia, controlled reperfusion, myocardial protection for specific clinical problems, Complications of cardioplegia. Non cardioplegic methods during cardiac surgery on cardiopulmonary bypass


10. Oxygenation – general consideration, bubble & membrane (Including assessment and comparison of oxygenator function)


12. Priming fluids and hemodilution and blood conservation techniques

**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

Syllabus for Third year Allied Health science courses RGUHS

B.Sc Perfusion Technology

Paper-II Perfusion Technology - Applied


2. Anticoagulation on bypass, its monitoring, its reversal and complications. Heparinless bypass. Platelet aggregation and platelet dysfunction. Coagulopathies due to cardiopulmonary
bypass and its management. Thrombo Elastograph (TEG) and its application.

3. Inflammatory response to cardiopulmonary bypass & its clinical effects. Methods to minimise the same. Immune response, neuroendocrine, renal, metabolic splanchnic response, pulmonary response and electrolyte response to cardiopulmonary bypass, Vasoplegic Syndrome and its prevention, Application of CytoSorb Fileters

4. Blood conservation hemofiltration & dialysis during cardiopulmonary bypass including modified ultra filtration reverse autologous priming and other methods -

5. Micro emboli- gaseous and particulate, filters used in cardiopulmonary bypass circuit.

6. Micro pore filtration during cardiopulmonary bypass

7. IABP Principles in detail, timing errors and complications. and Ventricular Assist Devices – Types

**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 i 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.

Syllabus for Third year Allied Health science courses RGUHS

B.Sc Perfusion Technology

Paper-III Perfusion Technology - Advanced

(1) Perfusion techniques for Pediatric and Neonatal cardiac surgery
(2) ECMO types - VA, VV, Indications – Monitoring – Management – Anticoagulation
Management – Bridging and Weaning - Preservation of circuit
(3) Special perfusion techniques for special cardiac surgeries and medical conditions (including thoracic aortic surgeries under hypothermia and circulatory arrest) Strategies of effective rewarming (practical methods and its consequences)
(4) Perfusion for non cardiac surgery, invasive cardiology and outside the operation suite. Selective organ perfusion, ANGIOVAC, perfusion for non heart beating kidney donation etc.,
(5) Complications and safety during initiation, maintenance and Termination of cardiopulmonary bypass – bypass safety, organizational aspects, accidents, coagulopathies, mechanical and electrical failures, perfusion management, perfusion systems, safety for the perfusionist and surgical team management of perfusion accidents
(6) Minimally invasive surgery and the Perfusionist - TAVI, TAVR, Mitraclip, Cardiobanding etc.,

Recent advances in perfusion techniques

(7) Hyper Thermic Intra Peritonal Chemo Theraphy (HIPEC) and Isolated limb Perfusion
(8) Heart and lung transplantation - basics of organ harvesting and organ preservation.

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 i 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.