REVISED ORDINANCE GOVERNING
REGULATIONS & CURRICULUM FOR BACHELOR OF SCIENCE DEGREE COURSES
IN
ALLIED HEALTH SCIENCE FOR FIRST YEAR
BSc. Perfusion Technology

1. Title of the Courses offered in Allied Health Sciences:

1. Bachelor of Science in Medical Laboratory Technology [B.Sc. (M.L.T)]
2. Bachelor of Science in Operation Theatre Technology [B.Sc. O.T. Technology]
3. Bachelor of Science in Cardiac Care Technology [B.Sc Cardiac Care Technology]
4. Bachelor of Science in Perfusion Technology [B.Sc. Perfusion Technology]
5. Bachelor of Science in Neuro Science Technology [B.Sc. Neuro Science Technology]
6. Bachelor of Science in Renal Dialysis Technology [B.Sc. Renal Dialysis Technology]
7. Bachelor of Science in Respiratory Care Technology [B.Sc. Respiratory Care Technology]
8. Bachelor of Science in Anaesthesia Technology [B.Sc. Anaesthesia Technology]
9. Bachelor of Science in Imaging Technology [B.Sc. Imaging Technology]
10. Bachelor of Science in Radiotherapy Technology [B.Sc. Radiotherapy Technology]

2. Eligibility for admission:
A candidate seeking admission to the Bachelor of Science Degree Courses in the Allied Health Sciences course from Sl.No. 1 to 10 shall have studied English as one of the principal subject during the tenure of the course and for those seeking admission to the Bachelor of Science Degree Courses in the Allied Health Sciences courses from Sl.No. 1 to 8 mentioned above except for B.Sc. Imaging Technology and B.Sc. Radiotherapy Technology 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 principle 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 principal subjects of study.

   OR

   1
3. Any equivalent examination recognized by the Rajiv Gandhi University of Health Sciences, Bangalore for the above purpose with Physics, Chemistry and Biology as principal 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 a subject for which the candidate desires to enroll, in the respective Allied Health Sciences course mentioned in Sl. No. 1 to 10 shall have passed plus 12 [10+2] with Physics, Chemistry and Biology, as principal subjects or candidates with 3 years diploma from a recognized Government Board in a subject for which the candidate desires to enroll, in the respective Allied Health Sciences course mentioned in Sl. No. 1 to 10 should have studied Physics, Biology and Chemistry as principal subjects during the tenure of the course.

6. Lateral entry to second year for allied health science courses 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.

7. In case of admission to B.Sc. Imaging Technology or B.Sc Radiotherapy Technology the candidate should have passed Pre-University or equivalent examination with Physics, Chemistry, Biology and Mathematics, as principal subjects of study.

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

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

6. In case of admission to B.Sc. Imaging Technology or B.Sc. Radiotherapy Technology the candidate should have passed Pre-University or equivalent examination with Physics, Chemistry, Biology and Mathematics, as principal subjects of study.

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

   b. Candidates who have completed diploma or vocational course through Correspondence, shall not be eligible for any of the courses mentioned above.
3. Duration of the course:
   Duration shall be for a period of three and half years including six months of Internship.

4. Medium of instruction:
   The medium of instruction and examination shall be in English.

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

6. 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 the 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.

7. Internal Assessment (IA):
   Theory - 20 marks.
   Practical - 20 marks. [Lab work - 12 marks and Record - 8 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.

8. 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>S L No</th>
<th>Subject</th>
<th>Theory No. of Hours</th>
<th>Practical No. of Hours</th>
<th>Total No. of Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Human Anatomy</td>
<td>70</td>
<td>20</td>
<td>90</td>
</tr>
<tr>
<td>2</td>
<td>Physiology</td>
<td>70</td>
<td>20</td>
<td>90</td>
</tr>
<tr>
<td>3</td>
<td>Biochemistry</td>
<td>70</td>
<td>20</td>
<td>90</td>
</tr>
<tr>
<td>4</td>
<td>Pathology-[Clinical pathology, Haemotology &amp; Blood -- Banking]</td>
<td>70</td>
<td>20</td>
<td>90</td>
</tr>
<tr>
<td>5</td>
<td>Microbiology</td>
<td>70</td>
<td>20</td>
<td>90</td>
</tr>
<tr>
<td></td>
<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

Hospital posting ~470 Hours -

- Friday: 9am – 1pm and 2pm - 4:30 pm
- Saturday: 9am - 1pm

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Table - II Distribution of Teaching Hours in Second Year Subjects

<table>
<thead>
<tr>
<th>S L No</th>
<th>Subject</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>Medicine relevant to perfusion technology</td>
<td>50</td>
<td>--</td>
<td>--</td>
<td>50</td>
</tr>
<tr>
<td>2</td>
<td>Section A Applied Pathology</td>
<td>30</td>
<td>30</td>
<td>--</td>
<td>120</td>
</tr>
<tr>
<td></td>
<td>Section B Applied Microbiology</td>
<td>30</td>
<td>30</td>
<td>--</td>
<td>120</td>
</tr>
<tr>
<td>3</td>
<td>Applied Pharmacology</td>
<td>50</td>
<td>--</td>
<td>--</td>
<td>50</td>
</tr>
<tr>
<td>4</td>
<td>Introduction to Perfusion Technology</td>
<td>80</td>
<td>100</td>
<td>650</td>
<td>830</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>240</td>
<td>160</td>
<td>650</td>
<td>1050</td>
</tr>
</tbody>
</table>

Subsidiary Subjects

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

Table - III Distribution of Teaching Hours in Third Year Subjects

<table>
<thead>
<tr>
<th>S L No</th>
<th>Subject</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>Perfusion Technology – Clinical</td>
<td>50</td>
<td>50</td>
<td>250</td>
<td>350</td>
</tr>
<tr>
<td>2</td>
<td>Perfusion Technology – Applied</td>
<td>50</td>
<td>50</td>
<td>250</td>
<td>350</td>
</tr>
<tr>
<td>3</td>
<td>Perfusion Technology – Advanced</td>
<td>50</td>
<td>50</td>
<td>250</td>
<td>350</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>150</td>
<td>150</td>
<td>750</td>
<td>1050</td>
</tr>
</tbody>
</table>
9. 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.

10. 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 Examinations & Practical.

Written Examinations consists of
04 papers in the 2nd Year
03 papers in the 3rd Year.

Practical examination:
Two practical examinations at the end 2nd Year and one practical examination at the end of the 3rd year.

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

The University examination for 2nd and 3rd year shall consist of Written Paper Practical
Written Examinations consists of
04 papers in the 2nd Year
03 papers in the 3rd Year.

Practical examination:
Two practical examinations at the end 2nd Year and one set of practical examination of 06 hours duration covering all the 3 papers 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>I.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>

**B** Subsidiary Subject**

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<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**

* I A = Internal Assessment
Main Subjects shall have University Examination.
There Shall be no University Practical Examination.
** Subsidiary subjects : Examination for subsidiary subjects shall be conducted by respective colleges.

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### TABLE V
**Distribution of Subjects and marks for Second Year Examination.**

<table>
<thead>
<tr>
<th>Paper</th>
<th>Subjects</th>
<th>Theory</th>
<th>Viva-voca</th>
<th>IA</th>
<th>Sub Total</th>
<th>Practicals</th>
<th>I.A. Sub Total</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Section A - Applied Pathology&lt;br&gt;Section B - Applied Microbiology</td>
<td>50</td>
<td>30</td>
<td>20</td>
<td>150</td>
<td>40</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>II</td>
<td>Introduction to Perfusion Technology</td>
<td>100</td>
<td>30</td>
<td>20</td>
<td>150</td>
<td>40</td>
<td>10</td>
<td>50</td>
</tr>
<tr>
<td>III</td>
<td>Pharmacology</td>
<td>80</td>
<td>--</td>
<td>20</td>
<td>100</td>
<td>No Practicals</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>Medicine relevant to Perfusion Technology</td>
<td>80</td>
<td>--</td>
<td>20</td>
<td>100</td>
<td>No Practicals</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
### Distribution of Subsidiary Subjects and marks for Second Year Examination

<table>
<thead>
<tr>
<th></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>Sociology</td>
<td>3 hours</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>Constitution of India</td>
<td>3 hours</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>Environmental Science &amp; Health</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.

### TABLE – VI

**Distribution of Subjects and marks for Third Year Examination.**

<table>
<thead>
<tr>
<th>Paper</th>
<th>Subjects</th>
<th>Theory</th>
<th>Viva-voca</th>
<th>IA</th>
<th>Sub Total</th>
<th>Practicals</th>
<th>I.A.</th>
<th>Sub Total</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Perfusion Technology – Clinical</td>
<td>100</td>
<td>30</td>
<td>20</td>
<td>150</td>
<td>120 (40+40+40)</td>
<td>30</td>
<td>150</td>
<td>600</td>
</tr>
<tr>
<td>II</td>
<td>Perfusion Technology – Applied</td>
<td>100</td>
<td>30</td>
<td>20</td>
<td>150</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>Perfusion Technology – Advanced</td>
<td>100</td>
<td>30</td>
<td>20</td>
<td>150</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** Practicals-One common practical for all the three papers with equal weight age of marks i.e. 40 practical mark and 10 I.A. marks for each paper.

### Distribution of Subsidiary Subjects and marks for Third Year Examination

<table>
<thead>
<tr>
<th></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>
</tbody>
</table>

** Subsidiary subjects: Examination for subsidiary subjects shall be conducted by respective colleges.
11. **Pass criteria**

11.1. **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.

11.2. **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, internal assessment and Viva-Voce 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.

   In the third year a candidate is declared to have passed only if he/she passes all the three theory papers and one practical examination in a single attempt failing which where in the candidate fails in one or more theory papers and or practical examination he/she will have to re appear for all the 3 theory papers and the practical examination in the subsequent attempt.

   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.

12. **Carry over benefit**

12.1 **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; otherwise he/she shall not permitted to proceed to third year.

12.2. **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.
13. 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)]

14. 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 award of degree.
15. Distribution of Type of Questions and Marks for Various Subjects

### THEORY

** SUBJECTS HAVING MAXIMUM MARKS = 100

<table>
<thead>
<tr>
<th>TYPE OF QUESTION</th>
<th>NUMBER OF QUESTIONS</th>
<th>MARKS FOR EACH QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESSAY TYPE</td>
<td>3 (2x10)</td>
<td>10</td>
</tr>
<tr>
<td>SHORT ESSAY TYPE</td>
<td>12 (10 x 5)</td>
<td>5</td>
</tr>
<tr>
<td>SHORT ANSWER TYPE</td>
<td>12 (10 x 3)</td>
<td>3</td>
</tr>
</tbody>
</table>

** SUBJECTS HAVING MAXIMUM MARKS = 80

<table>
<thead>
<tr>
<th>TYPE OF QUESTION</th>
<th>NUMBER OF QUESTIONS</th>
<th>MARKS FOR EACH QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESSAY TYPE</td>
<td>3 (2x10)</td>
<td>10</td>
</tr>
<tr>
<td>SHORT ESSAY TYPE</td>
<td>8 (6 x 5)</td>
<td>5</td>
</tr>
<tr>
<td>SHORT ANSWER TYPE</td>
<td>12(10 x 3)</td>
<td>3</td>
</tr>
</tbody>
</table>

** SUBJECTS HAVING MAXIMUM MARKS = 60

<table>
<thead>
<tr>
<th>TYPE OF QUESTION</th>
<th>NUMBER OF QUESTIONS</th>
<th>MARKS FOR EACH QUESTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESSAY TYPE</td>
<td>3 (2x10)</td>
<td>10</td>
</tr>
<tr>
<td>SHORT ESSAY TYPE</td>
<td>7(5x5)</td>
<td>5</td>
</tr>
<tr>
<td>SHORT ANSWER TYPE</td>
<td>7(5x3)</td>
<td>3</td>
</tr>
</tbody>
</table>

** SUBJECTS HAVING MAXIMUM MARKS = 50

<table>
<thead>
<tr>
<th>TYPE OF QUESTION</th>
<th>NUMBER OF QUESTIONS</th>
<th>MARKS FOR EACH QUESTION</th>
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</thead>
<tbody>
<tr>
<td>ESSAY TYPE</td>
<td>3 (2x10)</td>
<td>10</td>
</tr>
<tr>
<td>SHORT ESSAY TYPE</td>
<td>5 (5x5)</td>
<td>5</td>
</tr>
<tr>
<td>SHORT ANSWER TYPE</td>
<td>7(5x3)</td>
<td>3</td>
</tr>
</tbody>
</table>

---

**Deleted:** [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 award of degree.

**Deleted:** [11. Pass criteria]
11.1. 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.

11.2. 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, internal assessment and Viva-Voce 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.

**Deleted:** If a candidate fails in English in first year, he/she shall be permitted to carry over the subject, but has to pass in English before appearing for the second year university examination.

**Deleted:** 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.

**Deleted:** If a candidate fails in subsidiary subject in second year, he/she shall be permitted to carry over the subject, but has to pass this subject before appearing for the third year university examination.

**Deleted:** [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 award of degree. [1]
Syllabus for First year Allied Health science courses  

BSc. Perfusion Technology

ANATOMY

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

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

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
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 glad – gross
Practical: Demonstration of section of male and female pelves 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
Ovulation, fertilization
Fetal circulation
Placenta
   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 Anatomy shall be as given under.

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<tr>
<td><strong>Total Marks</strong></td>
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<td><strong>80</strong></td>
</tr>
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</table>

**NO PRACTICAL EXAMINATION**

**REFERENCE BOOKS**

Anatomy

1. William Davis (P) understanding Human Anatomy and Physiology MC Graw 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)
5. ESTER . M. Grischimer, Physiology & Anatomy with Practical Considerations, J.P. Lippin Cott, Philadelphia

5. Essential of Human embryology, Bhatnagar revised edition, Orient Longman PVT Ltd.

**Syllabus for First year Allied Health science courses - RGUHS**

**BSc. Perfusion Technology**

**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, functions, concentration physiological variation
Methods of Estimation of Hb
White blood cells – Production, function, life span, count, differential count
Platelets – Origin, normal count, morphology functions.
Plasma Proteins – Production, concentration, types, albumin, globulin, Fibrinogen, Prothrombin functions.
Haemostasis & Blood coagulation
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 in compatibility.
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,
Blood Volume-Normal value, determination of blood volume and regulation of blood volume
Body fluid – pH, normal value, regulation and variation
Lymph – lymphoid tissue formation, circulation, composition and function of lymph

Cardiovascular system
Heart – Physiological Anatomy, Nerve supply
Properties of Cardiac muscle,
Cardiac cycle-systole, diastole. Intraventricular pressure curves.
Cardiac Output – only definition
Heart sounds Normal heart sounds Areas of auscultation.
Blood Pressure – Definition, normal value, clinical measurement of blood pressure.
Physiological variations, regulation of heart rate, cardiac shock, hypotension, hypertension.
Pulse – Jugular, radial pulse, Triple response
Heart sounds – Normal heart sounds, cause characteristics and signification. Heart rate
Electrocardiogram (ECG) – significance.
Digestive System - Physiological anatomy of Gastro intestinal tract, Functions of digestive system
Salivary glands Structure and functions. Deglutination – stages and regulation
Stomach – structure and functions
Gastric secretion – Composition function regulation of gastric juice secretion
Pancrease – structure, function, composition, regulation of pancreatic juice
Liver – functions of liver
Bile secretion, composition, function regulation of bile secretion. Bilirubin metabolism types of bilirubin, Vanderberg reaction, Jaundice- types, significance.
Gall bladder – functions
Intestine – small intestine and large intestine
Small intestine – Functions: Digestive, absorption, movements.
Large intestine – Functions, Digestion and absorption of Carbohydrates, Proteins, Fats, Lipids, Defecation
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 and rigorous respiration. Forces opposing and favouring expansion of the lungs. Intra pulmonary pleural pressure, surface tension, recoil tendency of the wall. H
Transportation of Respiratory gases:

Lung volumes and capacities
Applied Physiology and Respiration: Hypoxia, Cyanosis, Asphyxia, Dyspnea, Dysbarism, Artificial Respiration, Apnoea.
Endocrine System - Definition Classification of Endocrine glands & their Hormones
Properties of Hormones.
Thyroid gland hormone – Physiological, Anatomy, Hormone secretion, Physiological function, regulation of secretion. Disorders – hypo and hyper secretion of hormone
Adrenal gland, Adrenal cortex physiologic anatomy of adrenal gland,
Adrenal cortex, cortical hormones – functions and regulation
Adrenal medulla – Hormones, regulation and secretion. Functions of Adrenaline and nor adrenaline
Pituitary hormones – Anterior and posterior pituitary hormones, secretion, function
Pancreas – Hormones of pancreas
Insulin – secretion, regulation, function and action
Diabetes mellitus – Regulation of blood glucose level
Parathyroid gland – function, action, regulation of secretion of parathyroid hormone.
Calcitonin – function and action
Special senses
Vision – structure of eye. Function of different parts.
Structure of retina
Hearing structure and function of can mechanism of hearing
Taste – Taste buds functions. Smell physiology, Receptors.
Nervous system
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.
Excretory System
Excretory organs
Mechanism of Urine formation: Ultrafiltration criteria for filtration GFR, Plasma fraction, EFP, factors effecting EFR. Determination of GFR selective reabsorption – sites of reabsorption, mechanisms of reabsorption Glucose, urea, H+ Cl aminoacids etc. TMG, Tubular lead, Renal threshold % of reabsorption of different substances, selective secretion. Properties and composition of normal urine, urine output. Abnormal constituents in urine, Mechanism of urine concentration.


Reproductive system

Muscle nerve physiology

Skin -structure and function
Body temperature measurement. Physiological variation, Regulation of body Temperature by physical chemical and nervous mechanisms. Role of Hypothalamus, Hypothermia and fever.

Practicals
Haemoglobinometry
White Blood Cell count
Red Blood Cell count
Determination of Blood Groups
Leishman’s staining and Differential WBC count
Determination of packed cell Volume
Erythrocyte sedimentation rate [ESR]
Calculation of Blood indices
Determination of Clotting Time, Bleeding Time
Blood pressure Recording
Auscultation for Heart Sounds
Artificial Respiration
Determination of vital capacity
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 Physiology shall be as given under.

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</tbody>
</table>

**Total Marks** 80

**NO PRACTICAL EXAMINATION**

**REFERENCE BOOKS**

**Physiology**

2. Chatterjee(CC) Human Physiology Latest Ed. Vol-1, Medical Allied Agency
3. Choudhari (Sujith K) Concise Medical Physiology Latest Ed. New Central Book,
Syllabus for First year Allied Health science courses

BSc. Perfusion Technology

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

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
   Re 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 uncertainty 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 H2SO4, 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 indicator, colour change of an indicator in acidic and basic conditions, use of standard buffer solution and indicators for pH determinations, preparation and its application, list of commonly used indicators and their pH range, suitable pH indicators used in different titrations, universal indicators
Practicals – Titration of a simple acid and a base (Preparation of standard solution of oxalic acid 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

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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**NO PRACTICAL EXAMINATION**

**REFERENCE BOOKS**

**Biochemistry**

1. Varley – Clinical chemistry
2. TEITZ – Clinical chemistry
3. Kaplan – Clinical chemistry
4. Ramakrishna(S) Prasanna(KG), Rajna © Text book of
   Medical Biochemistry Latest Ed Orient longman Bombay –1980
5. Vasudevan (DM) Sreekumari(S) Text book of
   Biochemistry for Medical students, Latest Ed
6. DAS(Debjyothi) Biochemistry
8. Practical Biochemistry for Medical Students – Rajagopal, Orient Longman PVT Ltd

23
Histo Pathology, Clinical Pathology, Haematology and Blood Banking

Theory – 70 hours

- 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

Practical – 20 hours

Clinical Pathology – Theory

- 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 – Theory

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

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 Pathology shall be as given under.

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NO PRACTICAL EXAMINATION

REFERENCE BOOKS
Pathology –
1. Culling Histopathology techniques
2. Bancroft Histopathology techniques
3. Koss – cytology
4. Winifred Greg – Diagnostic cytopathology
5. Orell – Cyto Pathology
6. Todd & Sanford Clinical Diagnosis by laboratory method
7. Dacie & Lewis – Practical Haematology
8. Ramanic Sood, Laboratory Technology (Methods and interpretation) 4th Ed.
   J.P. Bros, New Delhi –1996
9. Satish Gupta Short text book of Medical Laboratory for technician
   J.P. Bros, New Delhi – 1998
10. Sachdev K.N. Clinical Pathology and Bacteriology 8th Ed, J.P. Bros.
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
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). Staphylococci, 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 4 hours
   Causative agents, transmission methods, investigation, prevention and control of Hospital infection.
10. Principles and practice 4 hours
    Biomedical waste management.
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, Chacolate 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 mangement.
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 Practical need not be sent to the University.

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

<table>
<thead>
<tr>
<th>Type of Questions</th>
<th>No. of Questions</th>
<th>Marks</th>
<th>Sub-total</th>
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<tr>
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</tr>
<tr>
<td>Short Answer (SA)</td>
<td>12 (To Attempt 10)</td>
<td>10 x 3</td>
<td>30</td>
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<tr>
<td><strong>Total Marks</strong></td>
<td></td>
<td></td>
<td><strong>80</strong></td>
</tr>
</tbody>
</table>

NO PRACTICAL EXAMINATION

REFERENCE BOOKS

**Microbiology**
1. Ananthanarayana & Panikar Medical Microbiology
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
7. Basic laboratory procedures in clinical bacteriology, 1st Ed. J P Brothers, New Delhi
8. Medical Parasitology – Ajit Damle
9. Introduction to Medical Microbiology – Ananthanarayana, Orient Longman PVT Ltd.
Teaching Hours : 20

Course Description
This course will introduce students 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.

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 summarising
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
9. Communications skill in medicine, Hind, Orient Longman PVT Ltd.
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.

Unit - VI : Sampling Techniques
Need for sampling - 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.

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.

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.

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,
methohds 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.

1. Text Book of Environmental Studies for under gradute courses By Erach Bharucha

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

Concept of Software.
Classification of software : System software. Application of software. Operating
viruses. Computers in medical electronics
Basic Anatomy of Computers
Principles of programming
Computer application - principles in scientific research ; work processing, medicine,
libraries, museum , education, information system.

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

Scheme of Examination for MEDICAL ELECTRONICS including COMPUTER
APPLICATIONS
One Written (Theory) paper: Maximum Marks: ~80 marks.
No Practical or Viva voce examination
Syllabus for Second year Allied Health science courses   RGUHS
BSc. 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
   - Chemoprophylaxis.
   - 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.
PRACTICALS:

1. Preparation and prescription of drugs of relevance.
2. Experimental pharmacology directed to show the effects of commonly used drugs of relevance and interpretation of few charts.

**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 Pharmacology shall be as given under.

<table>
<thead>
<tr>
<th>Type of Questions</th>
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<td>30</td>
</tr>
<tr>
<td>Short Answer (SA)</td>
<td>12 (To Attempt 10)</td>
<td>10 x 3</td>
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</tr>
<tr>
<td>Total Marks</td>
<td></td>
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<td>80</td>
</tr>
</tbody>
</table>

**NO PRACTICAL EXAMINATION**

**Recommended Books.**

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.

PRACTICALS

1. Description & diagnosis of the following gross specimens.
   a. Atherosclerosis.
   b. Aortic aneurysm.
   c. Myocardial infarction.
   d. Emphysema
   e. Chronic glomerulonephritis.
   f. Chronic pyelonephritis.

2. Interpretation & diagnosis of the following charts.
   a. hematology Chart - AML, CML, Hemophilia, neutrophilia, eosinophilia.
   b. Urine Chart - ARF, CRF, Acute glomerulonephritis.

4. Estimation Bleeding & Clotting time.

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 Pathology shall be as given under.

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<tr>
<td>Short Essay (SE)</td>
<td>5 (To attempt 3)</td>
<td>3 x 5</td>
<td>15</td>
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<td>Short Answer (SA)</td>
<td>7 (To Attempt 5)</td>
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PRACTICAL EXAMINATION - 40 Marks.
There will be a Combined Practical examination for Applied Pathology & Applied Microbiology.

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Tests</th>
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</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Interpretation of Hematology Chart</td>
<td>05</td>
</tr>
<tr>
<td>02</td>
<td>Interpretation of Urine Chart</td>
<td>05</td>
</tr>
<tr>
<td>03</td>
<td>Estimation of Hemoglobin</td>
<td>05</td>
</tr>
<tr>
<td>04</td>
<td>Estimation of Bleeding time &amp; Clotting time</td>
<td>05</td>
</tr>
<tr>
<td>Total</td>
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<td>20</td>
</tr>
</tbody>
</table>
Syllabus for Second year Allied Health science courses  

**BSc. 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 syncial 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). 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

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Delete: PRACTICAL EXAMINATION - 40 Marks

There will be a Combined Practical examination for Applied Pathology & Applied Microbiology.

Delete: COURSE: II YEAR B.Sc Allied Health Sciences

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Create PDF files without this message by purchasing novaPDF printer (http://www.novapdf.com)
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 50 marks. Distribution of type of questions and marks for Applied Microbiology shall be as given under.

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<td>7 (To Attempt 5)</td>
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PRACTICAL EXAMINATION - 40 Marks.
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<td>01</td>
<td>Dry heat / Moist heat: Temperature recording charts interpretation</td>
<td>05</td>
</tr>
<tr>
<td>02</td>
<td>Dry heat / Moist heat: Color change indicators interpretation</td>
<td>05</td>
</tr>
<tr>
<td>03</td>
<td>Air sampling culture plates interpretation of Colony forming units based on air flow rate and sampling time</td>
<td>05</td>
</tr>
<tr>
<td>04</td>
<td>Interpretation of Sterility of Hemodialysis water/Distilled water/Deionised water based on growth of colonies in BHI agar to be reported as X CFU/mL</td>
<td>05</td>
</tr>
</tbody>
</table>

Total: 20
Syllabus for Second year Allied Health science courses   RGUHS
BSc. 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

42
There shall be one theory paper of three hours duration carrying 80 marks. Distribution of type of questions and marks for Medicine relevant to Perfusion Technology shall be as given under:

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<td>10 (To attempt 8)</td>
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**NO PRACTICAL EXAMINATION**

**Syllabus for Second year Allied Health science courses  RGUHS**

**BSc. 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.
- Haemodynamic monitoring
- Haemostatic monitoring
- Haemotologic monitoring
• Maintenance of oxygen, carbon dioxide and acid-base status and their monitoring
• Neurological monitoring (SSPE, EEG and cerebral function monitor)
• 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

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/hazards of:

a. blood failure
b. Bubble trap
c. Flow meters
d. Temperatures
e. Heat exchanger
f. Regulating devices

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.


**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 *Introduction to Anaesthesia Technology* shall be as given under.

<table>
<thead>
<tr>
<th>Type of Questions</th>
<th>No. of Questions</th>
<th>Marks</th>
<th>Sub-total</th>
</tr>
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<tbody>
<tr>
<td>Long Essay (LE)</td>
<td>3 (To attempt 2)</td>
<td>2 x 10</td>
<td>20</td>
</tr>
<tr>
<td>Short Essay (SE)</td>
<td>14 (To attempt 12)</td>
<td>12 x 5</td>
<td>60</td>
</tr>
<tr>
<td>Short Answer (SA)</td>
<td>12 (To Attempt 10)</td>
<td>10 x 2</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total Marks</strong></td>
<td></td>
<td></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

**PRACTICAL EXAMINATION** - 40 Marks.
Syllabus for Third year Allied Health science courses  
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. Pulsatile perfusion – Introduction, theory & physiology of pulsatile flow, hemodynamic, metabolic effects, Clinical use, hematological effects  
6. Cannulation techniques during cardiopulmonary bypass  
7. Termination of cardiopulmonary bypass – principles and methodology  
8. Myocardial protection and cardioplegia- pretreatment of the Myocardium, cardioplegia, hypothermia, controlled reperfusion, myocardial protection for specific clinical problems, Complications of cardioplegia. Non cardioplegic methods during cardiac surgery on cardiopulmonary bypass  
9. Oxygenation – general consideration, bubble & membrane (including assessment and comparison of oxygenator function)  
11. Priming fluids and hemodilution  

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 Paper-I - Perfusion Technology - Clinical shall be as given under.  

<table>
<thead>
<tr>
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<td>10 x 2</td>
<td>20</td>
</tr>
<tr>
<td>Total Marks</td>
<td></td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

PRACTICAL EXAMINATION  
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-II Perfusion Technology - Applied


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

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. Counter pulsation techniques and assist devices

**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 Paper-II - Perfusion Technology Applied shall be as given under.

<table>
<thead>
<tr>
<th>Type of Questions</th>
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</tr>
<tr>
<td>Short Answer (SA)</td>
<td>12 (To attempt 10)</td>
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<td>20</td>
</tr>
<tr>
<td>Total Marks</td>
<td></td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

**PRACTICAL EXAMINATION**
One common practical for all the three papers with equal weightage of marks i.e. 40 practical marks for each paper.
1. Perfusion techniques for Paediatric cardiac surgery

2. ECMO- special perfusion techniques for special cardiac surgeries and medical conditions (including thoracic aortic surgeries deep hypothermia and circulatory arrest). Perfusion for non cardiac surgery, invasive cardiology and outside the operation suite.

3. Perfusion as a method of cardiopulmonary bypass


5. Minimally invasive surgery and the perfusionist

6. Recent advances in perfusion techniques

7. Experimental perfusion

**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 Paper-III - Perfusion Technology Advanced shall be as given under.

<table>
<thead>
<tr>
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<tr>
<td>Short Answer (SA)</td>
<td>12 (To Attempt 10)</td>
<td>10 x 2</td>
<td>20</td>
</tr>
<tr>
<td>Total Marks</td>
<td></td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

**PRACTICAL EXAMINATION**

One common practical for all the three papers with equal weight age of marks i.e. 40 practical marks for each paper.
**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>
<td>80</td>
<td>20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Subsidiary Subject**</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>English</td>
<td>Total</td>
</tr>
<tr>
<td>2</td>
<td>Kannada</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>Health Care</td>
<td>100</td>
</tr>
</tbody>
</table>

Note  

* I.A = Internal Assessment  
Main Subjects shall have University Examination.  
There Shall be no University Practicals Examination.  

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

11. **Pass criteria**

11.1. 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.
11.2. 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, internal assessment and Viva-Voce 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.

12. Carry over benefit
12.1 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, otherwise he/she shall not permitted to proceed to third year.

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

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 QUESTION</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</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE OF QUESTION</td>
</tr>
<tr>
<td>--------------------------</td>
</tr>
<tr>
<td>ESSAY TYPE</td>
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<tr>
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<table>
<thead>
<tr>
<th>SUBJECTS HAVING MAXIMUM MARKS = 50</th>
</tr>
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<tbody>
<tr>
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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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<td>10</td>
<td>3</td>
<td>30</td>
</tr>
<tr>
<td><strong>Total Marks</strong></td>
<td></td>
<td></td>
<td><strong>80</strong></td>
</tr>
</tbody>
</table>

NO PRACTICAL EXAMINATION

REFERENCE BOOKS

Anatomy
1. William Davis (P) understanding Human Anatomy and Physiology MC Graw Hill

2. Chaursia –A Text book of Anatomy
   T.S. Ranganathan – A text book of Human Anatomy

3. Fattana, Human anatomy
   Description and applied
   Saunders & C P Prism Publishers,
   Bangalore – 1991

4. ESTER . M. Grishcimer,
   Physiology & Anatomy with Practical
   Considerations, J.P. Lippin Cott. Philadelphia
Scheme of Examination

Theory

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<td>80</td>
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NO PRACTICAL EXAMINATION

REFERENCE BOOKS

Biochemistry

Varley – Clinical chemistry
TEITZ – Clinical chemistry
3. Kaplan – Clinical chemistry
4. Ramakrishna(S) Prasanna(KG), Rajna ® Text book of Medical Biochemistry Latest Ed Orient longman Bombay –1980
5. Vasudevan (DM) Sreekumari(S) Text book of Biochemistry for Medical students ,Latest Ed

6. DAS(Debajyothi) Biochemistry
   Latest ED Academic, Publishers, Culcutta – 1992

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<td></td>
<td>80</td>
</tr>
</tbody>
</table>

NO PRACTICAL EXAMINATION
REFERENCES BOOKS
Pathology –

1. Culling Histopathology techniques
2. Bancroft Histopathology techniques
3. Koss – cytology
4. Winifred greg – Diagnostic cytopathology
5. Orell – Cyto Pathology
6. Todd & Sanford Clinical Diagnosis by laboratory method
7. Dacie & Lewis – Practical Haematology
8. Ramanic Sood, Laboratory Technology (Methods and interpretation) 4th Ed.
   J.P. Bros, New Delhi –1996)
9. Satish Gupta Short text book of Medical Laboratory for technician
   J.P. Bros, New Delhi – 1998
10. Sachdev K.N. Clinical Pathology and Bacteriology 8th Ed, J.P. Bros,

Scheme of Examination
Theory

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