

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 [BSc .O.T. Technology]
3. Bachelor of Science in Cardiac CareTechnology [B.Sc Cardiac CareTechnology]
- 4 .Bachelor of Science in PerfusionTechnology [BSc. PerfusionTechnology]
5. Bachelor of Science in Neuro Science Technology [BSc. Neuro Science Technology]
6. Bachelor of Science in . Renal Dialysis Technology [BSc. Renal Dialysis Technology]
7. Bachelor of Science in Respiratory Care Technology [BSc. Respiratory Care Technology]
8. Bachelor of Science in Anaesthesia Technology [BSc. Anaesthesia Technology]
9. Bachelor of Science in Imaging Technology [BSc. Imaging Technology]
10. Bachelor of Science in Radiotherapy Technology [BSc. 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

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 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 with in 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.

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*** 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

Main Subjects

S L No	Subject	Theory No. of Hours	Practical No. of Hours	Total No. of Hours
1	Human Anatomy	70	20	90
2	Physiology	70	20	90
3	Biochemistry	70	20	90
4	Pathology-[Clinical pathology,Haemotology & Blood –Banking	70	20	90
5	Microbiology	70	20	90
	Total	350	100	450

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

Subsidiary Subjects

English 25 Hours

Kannada 25 Hours

Health-Care 40 Hours

Hospital posting –470Hours-
Fri day 9am – 1pm and 2pm - 4-30 pm
Saturday 9am - 1pm

Table - II Distribution of Teaching Hours in Second Year Subjects

Main Subjects

S L No	Subject	Theory No. of Hours	Practical No. of Hours	Clinical posting	Total No. of Hours
1	Medicine relevant to perfusion technology	50	--	--	50
2	Section A Applied Pathology Section B Applied Microbiology	30 30	30 30	--	120
3	Applied Pharmacology	50	--	--	50
4	Introduction to Perfusion Technology	80	100	650	830
	Total	240	160	650	1050

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

Main Subjects

S L No	Subject	Theory No. of Hours	Practical No. of Hours	Clinical posting	Total No. of Hours
1	Perfusion Technology – Clinical	50	50	250	350
2	Perfusion Technology – Applied	50	50	250	350
3	Perfusion Technology – Advanced	50	50	250	350
	Total	150	150	750	1050

Subsidiary Subjects	
Ethics, Database Management	50 Hours
Research & Biostatistics	20 Hours
Computer application	10 Hours

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.

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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

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 .

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

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

Note * I A = Internal Assessment

Main Subjects shall have University Examination.

There Shall be no University Practical Examination.

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

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

Paper	Subjects	Theory				Practicals			Grand Total
		Theory	Viva-voca	IA	Sub Total	Practicals	I.A.	Sub Total	
I	Section A - Applied Pathology Section B - Applied Microbiology	50 50	30	20	150	40	10	50	200
II	Introduction to Perfusion Technology	100	30	20	150	40	10	50	200
III	Pharmacology	80	--	20	100	No Practicals			100
IV	Medicine relevant to Perfusion Technology	80	--	20	100	No Practicals			100

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¶ Distribution of Subjects and marks for First Year University theory Examination¶
¶
¶ A

Distribution of Subsidiary Subjects and marks for Second Year Examination

B	Subsidiary Subject**	Duration	Marks	I .A Theory Marks	Total Marks
1	Sociology	3 hours	80	20	100
2	Constitution of India	3 hours	80	20	100
3	Environmental Science & Health	3 hours	80	20	100

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

TABLE – VI

Distribution of Subjects and marks for Third Year Examination.

Paper	Subjects	Theory				Practicals **			Grand Total
		Theory	Viva-voca	IA	Sub Total	Practicals	I.A.	Sub Total	
I	Perfusion Technology – Clinical	100	30	20	150	120 (40+40+40)	30 (10+10+10)	150	600
II	Perfusion Technology – Applied	100	30	20	150				
IV	Perfusion Technology – Advanced	100	30	20	150				

** 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

B	Subsidiary Subject**	Duration	Marks	I .A Theory Marks	Total Marks
1	Ethics, Database Management	3 hours	80	20	100
2	Research & Biostatistics	3 hours	80	20	100
3	Computer application	3 hours	80	20	100

** 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/se 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.

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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.

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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.

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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.

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

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[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		
TYPE OF QUESTION	NUMBER OF QUESTIONS	MARKS FOR EACH QUESTION
ESSAY TYPE	3 (2x10)	10
SHORT ESSAY TYPE	12 (10 × 5)	5
SHORT ANSWER TYPE	12 (10 × 3)	3

SUBJECTS HAVING MAXIMUM MARKS = 80		
TYPE OF QUESTION	NUMBER OF QUESTIONS	MARKS FOR EACH QUESTION
ESSAY TYPE	3 (2x10)	10
SHORT ESSAY TYPE	8 (6 × 5)	5
SHORT ANSWER TYPE	12(10 × 3)	3

SUBJECTS HAVING MAXIMUM MARKS = 60		
TYPE OF QUESTION	NUMBER OF QUESTIONS	MARKS FOR EACH QUESTION
ESSAY TYPE	3 (2x10)	10
SHORT ESSAY TYPE	7(5x5)	5
SHORT ANSWER TYPE	7(5x3)	3

SUBJECTS HAVING MAXIMUM MARKS = 50		
TYPE OF QUESTION	NUMBER OF QUESTIONS	MARKS FOR EACH QUESTION
ESSAY TYPE	3 (2x10)	10
SHORT ESSAY TYPE	5(3x5)	5
SHORT ANSWER TYPE	7(5x3)	3

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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 ... [2]

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 ... [3]

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.

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Syllabus for First year Allied Health science courses RGUHS

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

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¶ THEORY¶

¶ SUBJECTS HAVING MAXIMUM MARKS = 100

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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 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

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9. Endocrine glands

Theory:

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

Practical: Demonstration of the glands
Histology of pituitary, thyroid, parathyroid, suprarenal glands

10. Nervous system

Theory:

Neuron

Classification of NS

Cerebrum, cerebellum, midbrain, pons, medulla oblongata, spinal cord with spinal nerve (gross & histology)

Meninges, Ventricles & cerebrospinal fluid

Names of basal nuclei

Blood supply of brain

Cranial nerves

Sympathetic trunk & names of parasympathetic ganglia

Practical: Histology of peripheral nerve & optic nerve
Demonstration of all plexuses and nerves in the body
Demonstration of all part of brain
Histology of cerebrum, cerebellum, spinal cord

Sensory organs:

Theory:

Skin: Skin-histology

Appendages of skin

Eye: parts of eye & lacrimal apparatus

Extra-ocular muscles & nerve supply

Ear: parts of ear- external, middle and inner ear and contents

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

Embryology

Theory:

Spermatogenesis & oogenesis

Ovulation, fertilization

Fetal circulation

Placenta

Internal Assessment

Theory - Average of 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.

Type of Questions	No. of Questions	Marks	Sub-total
Long Essay (LE)	3 (To attempt 2)	2 x 10	20
Short Essay (SE)	8 (To attempt 6)	6 x 5	30
Short Answer (SA)	12 (To Attempt 10)	10 x 3	30
Total Marks			80

NO PRACTICAL EXAMINATION

REFERENCE BOOKS

Anatomy

1. William Davis (P) understanding Human Anatomy and Physiology MC Graw Hill
2. Chaurasia – 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
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 20hours

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

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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.¶

¶ Type of Questions

... [5]

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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 Packed 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 significance. 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
Pancreas – structure, function, composition, regulation of pancreatic juice
Liver – functions of liver
Bile secretion, composition, function regulation of bile secretion .Bilirubin metabolism types of bilirubin, Vandernberg 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 :

Transportation of Oxygen : Direction, pressure gradient, Forms of transportation, Oxygenation of Hb. Quantity of Oxygen transported.

Lung volumes and capacities

Regulation of respiration what? Why? How? Mechanisms of Regulation, nervous and chemical regulation. Respiratory centre. Hearing Brier, Reflexes.

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

Endocrine System - Definition Classification of Endocrine glands & their Harmones

Properties of Harmones .

Thyroid gland hormone – Physiological, Anatomy, Hormone secreted, 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

Functions of Nervous system, Neurone structure, classification and properties. Neuroglia, nerve fiber, classification ,conduction of impulses continuous and saltatory. Velocity of impulse transmission and factors affecting. Synapse – structure, types, properties.

Receptors – Definition, classification ,properties. Reflex action – unconditioned properties of reflex action. Babinski's sign. Spinal cord nerve tracts. Ascending tracts, Descending tracts – pyramidal tracts – Extrapyramidal tracts. Functions of Medulla, pons, Hypothalamic disorders. Cerebral cortex lobes and functions, Sensory cortex, Motor cortex, Cerebellum functions of Cerebellum. Basal ganglion- functions. EEG.

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

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

Renal circulation peculiarities.

Mechanism of Urine formation : Ultrafiltration criteria for filtration GFR, Plasma fraction, EFP, factors effecting EFR. Determination of GFR selective reabsorption – sites of reabsorption ,substance reabsorbed, mechanisms of reabsorption Glucose, urea.

H + Cl aminoacids etc. TMG, Tubular load, Renal threshold % of reabsorption of different substances, selective e secretion.

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

Counter – Current Mechanisms : Micturition, Innervation of Bladder, Cystourethrogram.

Diuretics : Water, Diuretics, osmotic diuretics, Artificial kidney Renal function tests – plasma clearance Actions of ADH, Aldosterone and PTH on kidneys. Renal function tests

Reproductive system

Function of Reproductive system, Puberty, male reproductive system. Functions of testes, spermatogenesis site, stages, factors influencing semen. Endocrine functions of testes Androgens – Testosterone structure and functions. Female reproductive syystem. Ovulation, menstrual cycle. Physiological changes during pregnancy, pregnancy test. Lactation :

Composition of milk factors controlling lactation.

Muscle nerve physiology

Classification of muscle, structure of skeletal muscle, Sarcomere contractile proteins, Neuromuscular junction. Transmission across, Neuromuscular junction. Excitation contraction coupling. Mechanism of muscle contraction muscle tone, fatigue Rigour mortis

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 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 Physiology shall be as given under.

<u>Type of Questions</u>	<u>No. of Questions</u>	<u>Marks</u>	<u>Sub-total</u>
<u>Long Essay (LE)</u>	<u>3 (To attempt 2)</u>	<u>2 x 10</u>	<u>20</u>
<u>Short Essay (SE)</u>	<u>8 (To attempt 6)</u>	<u>6 x 5</u>	<u>30</u>
<u>Short Answer (SA)</u>	<u>12 (To Attempt 10)</u>	<u>10 x 3</u>	<u>30</u>
<u>Total Marks</u>			<u>80</u>

NO PRACTICAL EXAMINATION

REFERENCE BOOKS

Physiology

1. Guyton (Arthur) Text Book of Physiology.
Latest Ed. Prism publishers
2. Chatterjee(CC) Human Physiology Latest Ed.
Vol-1, Medical Allied Agency
3. Choudhari (Sujith K) Concise Medical Physiology Latest Ed. New Central
Book.
4. Ganong (William F) Review of Medical
Physiology. Latest Ed . Appleton

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Theory¶**

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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.¶

¶
Type of Questions ... [6]

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NO PRACTICAL EXAMINATION¶
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REFERENCE BOOKS¶
Physiology ¶
¶
1. Guyton(Arthur)Text Book of Physiology.¶
Latest Ed. Prism publishers¶
2. Chatterjee(CC) Human Physiology Latest Ed. ¶
Vol-1, Medical Allied Agency ¶
3. Choudhari (Sujith K) Concise Medical Physiology Latest Ed. New Central Book, ¶
4. Ganong (William F) Review of Medical ¶
Physiology. Latest Ed . Appleton

Syllabus for First year Allied Health science courses RGUHS

BSc. Perfusion Technology

BIOCHEMISTRY

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HEALTH SCIENCE COURSES
RGUHS

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No. Theory classes : 70hours

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 bottomed, Erlenmeyer 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

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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., 1N Na₂CO₃, 0.1N 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 N HCl 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.

Arrhenius 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, monoprotic and polyprotic acids and bases

Concepts of acid base reaction, hydrogen ion concentration, Ionisation of water, buffer, Ph value of a solution, preparation of buffer solutions using Ph meter.

Salts: Definition, classification, water of crystallization – definition and different types, deliquescent and hygroscopic salts

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.

<u>Type of Questions</u>	<u>No. of Questions</u>	<u>Marks</u>	<u>Sub-total</u>
<u>Long Essay (LE)</u>	<u>3 (To attempt 2)</u>	<u>2 x 10</u>	<u>20</u>
<u>Short Essay (SE)</u>	<u>8 (To attempt 6)</u>	<u>6 x 5</u>	<u>30</u>
<u>Short Answer (SA)</u>	<u>12 (To Attempt 10)</u>	<u>10 x 3</u>	<u>30</u>
<u>Total Marks</u>			<u>80</u>

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(Debajyothi) Biochemistry Latest ED Academic. Publishers, Culcutta – 1992
7. Text Book of Medical Biochemistry – 3rd Edition, Orient Longman PVT Ltd
8. Practical Biochemistry for Medical Students – Rajagopal, Orient Longman PVT Ltd

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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.¶

¶ Type of Questions

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

PATHOLOGY

Histo Pathology ,Clinical Pathology, Haematology and Blood Banking

Theory – 70 hours

Practical – 20 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

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.

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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 Practical need not be sent to the University.

Scheme of Examination Theory

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

<u>Type of Questions</u>	<u>No. of Questions</u>	<u>Marks</u>	<u>Sub-total</u>
<u>Long Essay (LE)</u>	<u>3 (To attempt 2)</u>	<u>2 x 10</u>	<u>20</u>
<u>Short Essay (SE)</u>	<u>8 (To attempt 6)</u>	<u>6 x 5</u>	<u>30</u>
<u>Short Answer (SA)</u>	<u>12 (To Attempt 10)</u>	<u>10 x 3</u>	<u>30</u>
<u>Total Marks</u>			<u>80</u>

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, New Delhi-1991.
11. Krishna - Text book of Pathology, Orient Longman PVT Ltd. Bacteriology 8th Ed, J.P. Bros, New Delhi-1991.

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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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Syllabus for First year Allied Health science courses RGUHS

BSc. Perfusion Technology

Microbiology

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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 inspissator. Pasteurization, Anti septic and disinfectants.
Antimicrobial sensitivity test
4. Immunology 6 hours
Immunity Vaccines, Types of Vaccine and immunization schedule
Principles and interpretation of commonly done serological tests namely Widal, VDRL, ASLO, CRP, RF & ELISA. Rapid tests for HIV and HbsAg (Technical details to be avoided)
5. Systematic Bacteriology 20 hours
Morphology, cultivation, diseases caused, laboratory diagnosis including specimen collection of the following bacteria (the classification, antigenic structure and pathogenicity are not to be taught)
Staphylococci, Streptococci, Pneumococci, Gonococci, Meningococci, 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 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.

Type of Questions	No. of Questions	Marks	Sub-total
Long Essay (LE)	3 (To attempt 2)	2 x 10	20
Short Essay (SE)	8 (To attempt 6)	6 x 5	30
Short Answer (SA)	12 (To Attempt 10)	10 x 3	30
Total Marks			80

NO PRACTICAL EXAMINATION

REFERENCE BOOKS

Microbiology

1. Anathanarayana & Panikar Medical Microbioloty
2. Roberty Cruckshank – Medical Microbiology – The Practice of Medical Mircrobiology
3. Chatterjee – Parasitology – Interpretation to Clinical medicine.
4. Rippon – Medical Mycology
5. Emmons – Medical mycology
6. Basic laboratory methods in Parasitology, 1st Ed, J P Bros, New Delhi – 199
7. Basic laboratory procedures in clinical bacteriology, 1st Ed, J P Brothers, New Delhi
8. Medical Parasitology – Ajit Damle
9. Introduction to Medical Microbiology –Anathanarayana, Orient Longman PVT Ltd.

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Theory¶

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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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Type of Questions ... [9]

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REFERENCE BOOKS¶

¶
Microbiology ¶

- 1 Anathanarayana&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¶
6. Basic laboratory methods in Parasitology. ¶
1st Ed, J.P.Bros, New Delhi – 1992¶
- ¶
7. Basic laboratory procedures in clinical ¶
bacteriology 1st Ed, J.P. Brothers, ¶
New Delhi – ¶
8. Medical Parasitology – Ajit Damle

Syllabus for First year Allied Health science courses RGUHS

BSc. 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.

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

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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

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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

Written (Theory): Maximum Marks: –80 marks.

No Practical or Viva voce examination

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

REFERENCE

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

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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 SD

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 : Samling 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.

B.K. Mahajan & M. Gupta (1995) Text Book of Preventive & Social Medicine, 2002, 17th
Edition Jaypee Brothers.

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.

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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

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Prescribed for the First Year students of all degree classes

Unit-I: Meaning of the term 'Constitution' making of the Indian Constitution 1946-1949.

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

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

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

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

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

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

Unit – VIII: Method of amending the Constitution.

Unit – IX: Enforcing rights through Writs:

Unit – X: Constitution and Sustainable Development in India.

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

ENVIRONMENT SCIENCE AND HEALTH

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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.

1. Text Book of Environmental Studies for under graduate courses By Erach Bharucha
Reprinted in 2006, Orient Longman Private Limited /Universities Press India Pvt. Ltd.

BASICS IN COMPUTER APPLICATIONS

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

Introduction to Data processing :

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

Hardware Concepts :

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

Concept of Software.

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

Basic Anatomy of Computers

Principles of programming

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

Data processing

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

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

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Allied Health Sciences

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- 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 Haemostasis – anticoagulants Thrombolytics and antithrombolytics.
- i. Cardioplegic drugs- History, Principles and types of cardioplegia.
- 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.

<u>Type of Questions</u>	<u>No. of Questions</u>	<u>Marks</u>	<u>Sub-total</u>
<u>Long Essay (LE)</u>	<u>3(To attempt 2)</u>	<u>2 x 10</u>	<u>20</u>
<u>Short Essay (SE)</u>	<u>8 (To attempt 6)</u>	<u>6 x 5</u>	<u>30</u>
<u>Short Answer (SA)</u>	<u>12 (To Attempt 10)</u>	<u>10 x 3</u>	<u>30</u>
<u>Total Marks</u>			<u>80</u>

NO PRACTICAL EXAMINATION

Recommended Books.

1. R. S. Satoskar, S.D. Bhandarkar, S. S. Ainapure, Pharmacology and Pharmacotherapeutics, 18th Edition, single Volume, M/S Popular Prakashan, 350, Madan Mohan Marg, Tardeo, Bombay – 400 034.
2. K.D. Tripathi, Essentials of Medical Pharmacology, V. Edition, M/s. Jaypee Brothers, Post Box, 7193, G-16, EMCA House, 23/23, Bansari Road, Daryaganj, New Delhi.
3. Laurence and Bennet, Clinical Pharmacology, ELBS Edition, 9th Edition.

Syllabus for Second year Allied Health science courses RGUHS

BSc. Perfusion Technology

APPLIED PATHOLOGY

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Allied Health Sciences

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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 infraction.
 - 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.
3. Estimation of Hemoglobin.
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.

<u>Type of Questions</u>	<u>No. of Questions</u>	<u>Marks</u>	<u>Sub-total</u>
<u>Long Essay (LE)</u>	<u>3(To attempt 2)</u>	<u>2 x 10</u>	<u>20</u>
<u>Short Essay (SE)</u>	<u>5 (To attempt 3)</u>	<u>3 x 5</u>	<u>15</u>
<u>Short Answer (SA)</u>	<u>7 (To Attempt 5)</u>	<u>5 x 3</u>	<u>15</u>
<u>Total Marks</u>			<u>50</u>

PRACTICAL EXAMINATION - 40 Marks.

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

<u>Sl. No.</u>	<u>Tests</u>	<u>Marks</u>
<u>01</u>	<u>Interpretation of Hematology Chart</u>	<u>05</u>
<u>02</u>	<u>Interpretation of Urine Chart</u>	<u>05</u>
<u>03</u>	<u>Estimation of Hemoglobin</u>	<u>05</u>
<u>04</u>	<u>Estimation of Bleeding time & Clotting time</u>	<u>05</u>
	<u>Total</u>	<u>20</u>

Syllabus for Second year Allied Health science courses RGUHS

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 syncytial virus etc), blood borne transmission (HIV, Hepatitis B, Hepatitis C, Cytomegalovirus, Ebola virus etc), or 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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There will be a Combined Practical examination for Applied Pathology & Applied Microbiology.

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PRACTICALS- 30 HOURS

1. Principles of autoclaving & quality control of Sterilization.
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.

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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.

Type of Questions	No. of Questions	Marks	Sub-total
Long Essay (LE)	3 (To attempt 2)	2 x 10	20
Short Essay (SE)	6 (To attempt 4)	4 x 5	20
Short Answer (SA)	7 (To Attempt 5)	5 x 2	10
Total Marks			50

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Principles of Microbiology¶
General introduction and History of Microbiology¶
Classification of Microbes ¶
Bacterial Cell¶
Antibacterial Agents and dis-infection¶
Sterilization¶
Antibiotics, Chemotherapy and Drug Resistance ¶
¶
Practical¶
Bacteriology¶
Morphology of bacteria¶
Hanging drop¶
Simple stains (Gram stain)¶
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PRACTICAL EXAMINATION - 40 Marks.

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

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Sl. No.	Tests	Marks
01	<u>Dry heat / Moist heat: Temperature recording charts interpretation</u>	<u>05</u>
02	<u>Dry heat / Moist heat: Color change indicators interpretation</u>	<u>05</u>
03	<u>Air sampling culture plates interpretation of Colony forming units based on air flow rate and sampling time</u>	<u>05</u>
04	<u>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</u>	<u>05</u>
	<u>Total</u>	<u>20</u>

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

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

MEDICINE RELEVANT TO PERFUSION TECHNOLOGY

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PERFUSION TECHNOLOGY

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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

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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 **Medicine relevant to Perfusion Technology** shall be as given under.

<u>Type of Questions</u>	<u>No. of Questions</u>	<u>Marks</u>	<u>Sub-total</u>
<u>Long Essay (LE)</u>	<u>3(To attempt 2)</u>	<u>2 x 10</u>	<u>20</u>
<u>Short Essay (SE)</u>	<u>10 (To attempt 8)</u>	<u>8 x 5</u>	<u>40</u>
<u>Short Answer (SA)</u>	<u>12 (To Attempt 10)</u>	<u>10 x 2</u>	<u>20</u>
<u>Total Marks</u>			<u>80</u>

NO PRACTICAL EXAMINATION

Syllabus for Second year Allied Health science courses RGUHS

BSc. Perfusion Technology

INTRODUCTION TO PERFUSION TECHNOLOGY

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PERFUSION TECHNOLOGY

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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.

Blood banking, handling of blood products and their management. Blood components and their use.

Scheme of Examination Theory

There shall be one theory paper of three hours duration carrying **100** marks. Distribution of type of questions and marks for **Introduction to Anaesthesia Technology** shall be as given under.

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

PRACTICAL EXAMINATION - 40 Marks.

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

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Paper-I Perfusion Technology Clinical

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III year B.Sc Perfusion Technology¶

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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)
10. Heat exchangers-principles function of heat exchangers & their assessment. Complications related to heat exchange and their management
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.

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

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

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1. Blood cell trauma – analysis of forces of fluid motion, effects of physical forces on blood cell, clinical effect. Complications of blood transfusion.
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.
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.

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

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-III Perfusion Technology - Advanced

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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
4. Complications and safety during 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.
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.

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

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

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

Note * I A = Internal Assessment

Main Subjects shall have University Examination.

There Shall be no University 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:

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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 be 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.

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

THEORY

SUBJECTS HAVING MAXIMUM MARKS = 100		
TYPE OF QUESTION	NUMBER OF QUESTIONS	MARKS FOR EACH QUESTION
ESSAY TYPE	2	10
SHORT ESSAY TYPE	12	5
SHORT ANSWER TYPE	10	2

SUBJECTS HAVING MAXIMUM MARKS = 80		
TYPE OF QUESTION	NUMBER OF QUESTIONS	MARKS FOR EACH QUESTION
ESSAY TYPE	2	10
SHORT ESSAY TYPE	8	5
SHORT ANSWER TYPE	10	2

SUBJECTS HAVING MAXIMUM MARKS = 50		
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TYPE OF QUESTION	NUMBER OF QUESTIONS	MARKS FOR EACH QUESTION
ESSAY TYPE	2	10
SHORT ESSAY TYPE	4	5
SHORT ANSWER TYPE	5	2

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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.

Type of Questions	No. of Questions	Marks	Sub-total
Long Essay (LE)	2	10	20
Short Essay (SE)	6	5	30
Short Answer (SA)	10	3	30
Total Marks			80

NO PRACTICAL EXAMINATION REFERENCE BOOKS

Anatomy

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

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

3. Fattana, Human anatomy
(Description and applied)
Saunder's & C P Prism Publishers,
Bangalore – 1991

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

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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.

Type of Questions	No. of Questions	Marks	Sub-total
Long Essay (LE)	2	10	20

Short Essay (SE)	6	5	30
Short Answer (SA)	10	3	30
Total Marks			80

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.

Type of Questions	No. of Questions	Marks	Sub-total
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Short Essay (SE)	6	5	30
Short Answer (SA)	10	3	30
Total Marks			80

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

Scheme of Examination *Theory*

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Short Essay (SE)	6	5	30
Short Answer (SA)	10	3	30
Total Marks			80

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, New Delhi-1991.

Scheme of Examination

Theory

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