# Revised Ordinance Governing Regulations and Curriculum
# Of
## B.Sc. OPERATION THEATRE TECHNOLOGY COURSE • 2019

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

# The Emblem


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

ರಾಜೀವ್ ಗಾಂಧಿ ಆರೋಗ್ಯ ವಿಜ್ಞಾನಗಳ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಕರ್ನಾಟಕ, ಬೆಂಗಳೂರು
RAJIV GANDHI UNIVERSITY OF HEALTH SCIENCES, KARNATAKA, BENGALURU
4th T Block, Jayanagar, Bengaluru – 560 041

**Ref: ACA/DCD/AHS/B.Sc OTT/362 (b)/2019-20** **Date: 28/08/2019**

**NOTIFICATION**

Sub: Revised Ordinance pertaining to Regulation and Curriculum of B.Sc Operation Theatre Technology.

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

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

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

By Order,

**REGISTRAR**

To

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

Copy to :

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

# REVISED ORDINANCE GOVERNING REGULATIONS & CURRICULUM OF BACHELOR OF OPERATION THEATRE TECHNOLOGY COURSE - 2019

1. **Eligibility for admission:**

   A candidate seeking admission to the B.Sc Anaesthesia Technology shall have studied English as one of the principal subject during the tenure of the 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 anaesthesia technology 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 Anaesthesia Technology should have studied Physics, Biology and Chemistry as principal subjects during the tenure of the course.

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

**Note:**

a. The candidate shall have passed individually in each of the 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 four years including 1 year 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 1 st, 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 - 10 marks. [Lab work- 06 marks and Record-04 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.

* 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

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

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

**Subsidiary Subjects**

English 25 Hours
Kannada 25 Hours
Health-Care 40 Hours
Clinical/Lab posting- 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

| Sl. No. | Subject | Theory No. of Hours | Practical No. of Hours | Clinical posting | Total No. of Hours |
|---|---|---|---|---|---|
| 1. | Medicine relevant to O.T. technology | 50 | -- | -- | 50 |
| 2. | Section A Applied Pathology<br>Section B Applied Microbiology | 30<br>30 | 30<br>30 | -- | 120 |
| 3. | Pharmacology | 50 | -- | -- | 50 |
| 4. | Introduction to Operation Theatre 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**

| Sl. No. | Subject | Theory No. of Hours | Practical No. of Hours | Clinical posting | Total No. of Hours |
|---|---|---|---|---|---|
| 1. | Operation Theatre Technology - Clinical | 50 | 50 | 250 | 350 |
| 2. | Operation Theatre Technology - Applied | 50 | 50 | 250 | 350 |
| 3. | Operation Theatre Technology - Advanced | 50 | 50 | 250 | 350 |
| | Total | 150 | 150 | 750 | 1050 |

**Subsidiary Subjects**

| | |
|---|---|
| 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.

**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.

**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 | 100 | 20 | 120 |
| 2. | Physiology | 3 hours | 100 | 20 | 120 |
| 3. | Biochemistry | 3 hours | 100 | 20 | 120 |
| 4. | Pathology | 3 hours | 100 | 20 | 120 |
| 5. | Microbiology | 3hours | 100 | 20 | 120 |
| | 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**

| | | Theory | | | | Practicals | | | |
|---|---|---|---|---|---|---|---|---|---|
| Paper | Subject | Theory | Vivavoca | IA | Sub Total | Univ. Practical | IA | Sub Total | Grand Total |
| i | Section A - Applied Pathology<br>Section B - Applied Microbiology | 50<br>50 | - | 20 | 120 | 40 | 10 | 50 | 170 |
| ii | Introduction to Operation Technology | 100 | - | 20 | 120 | 40 | 10 | 50 | 170 |
| iii | Applied Pharmacology | 100 | -- | 20 | 120 | No Practicals | | | 120 |
| iv | Medicine relevant to O. T. technology | 100 | -- | 20 | 120 | No Practicals | | | 120 |

**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 | Subject | Theory | Vivavoca | IA | Sub Total | Univ. Practical | IA | Sub Total | Grand Total |
|---|---|---|---|---|---|---|---|---|---|
| i | Operation Technology - Clinical | 100 | - | 20 | 120 | 120 (40 + 40 + 40) | 30 (10 + 10 + 10) | 150 | 510 |
| ii | Operation Technology - Applied | 100 | - | 20 | 120 | | | | |
| iii | Operation Technology - Advanced | 100 | - | 20 | 120 | | | | |

** 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. | Biostatistics | 3 hours | 80 | 20 | 100 |
| 2. | 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 and internal assessment added together and for pass in Practical, a candidate has to secure minimum of 40% marks in the university conducted Practical/Clinical examination and 50% in aggregate i.e. University conducted Practical/Clinical and Internal Assessment.

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

**12.Carry over benefit**
**12.1 First year examination:**

A candidate who fails in any two of the five main subjects of first year shall be permitted to carry over those subjects to second year. However, he/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.

b. A candidate having appeared in all subjects in the same examination and passed that examination in the first attempt and secures 60% of marks or more but less

than 75% of grand total marks prescribed will be declared to have passed the examination in First Class.

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

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

e. The marks obtained by a candidate in the subsidiary subjects shall not be considered for award of Class or Rank.
[Please note fraction of marks should not be rounded off clauses (a), (b) and (c)]

**14. Eligibility for the award of Degree:**

A candidate shall have passed in all the subjects of first, second and third year to be eligible for award of degree.

**THEORY**:

| SUBJECTS HAVING MAXIMUM MARKS= 100 | | | |
|---|---|---|---|
| Type of Questions | No. of Questions | Marks for Each Questions | Total |
| Long Essay | 2 | 10 x2 | 20 |
| Short Essay | 10 | 10 x 5 | 50 |
| Short Answer | 10 | 10 x 3 | 30 |

**TOTAL = 100**

1. Long essay- 2 Questions (second question choice) 2x10= 20 marks
2. Short essay- 10 Questions (Questions no 5 &10 choice) 10x5= 50 marks
3. Short answer- 10 Questions (Questions no 15 & 20 choice)10x3= 30 marks

## Distribution of Marks for University Theory and Practical Exam (first year)

| | Practicals | | | Grand total | |
|---|---|---|---|---|---|
| Theory | IA | Sub Total | Practicals | IA | 120 |
| 100 | 20 | 120 | * | - | 120 |

| SUBJECTS HAVING MAXIMUM MARKS = 80 (**SUBSIDIARY SUBJECTS)** | | |
|---|---|---|
| Type of Questions | No of Questions | Marks For Each Questions |
| Essay Type | 3 ( 2x 10) | 10 |
| Short Essay Type | 8 (6 x 5) | 05 |
| Short Answers Type | 12 (10 x 3) | 03 |

## Main Subjects

# ANATOMY

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

**Introduction: human body as a whole**
**Theory:**

Definition of anatomy and its divisions
Terms of location, positions and planes Cell and its organelles
Epithelium-definition, classification, describe with examples, function
Glands- classification, describe serous & mucous glands with examples Basic tissues - classification with examples Practical:
Histology of types of epithelium
Histology of serous, mucous & mixed salivary gland

**Locomotion and support**
**Theory:**

Cartilage - types with example & histology
Bone - Classification, names of bone cells, parts of long bone, microscopy of compact bone,
names of all bones, vertebral column, intervertebral disc, fontanelles of fetal skull Joints - Classification of joints with examples, synovial joint (in detail for radiology) Muscular system: Classification of muscular tissue & histology Names of muscles of the body
Practical: Histology of the 3 types of cartilage
Demo of all bones showing parts, radiographs of normal bones & joints
Histology of compact bone (TS & LS)
Demonstration of all muscles of the body
Histology of skeletal (TS & LS), smooth & cardiac muscle

**3. Cardiovascular system**

**Theory:**

Heart-size, location, chambers, exterior & interior Blood supply of heart
Systemic & pulmonary circulation
Branches of aorta, common carotid artery, subclavian artery, axillary artery, brachial artery, superficial palmar arch, femoral artery, internal iliac artery Peripheral pulse
Inferior venacava, portal vein, portosystemic anastomosis Great saphenous vein
Dural venous sinuses

Lymphatic system- cisterna chyli & thoracic duct
Histology of lymphatic tissues
Names of regional lymphatics, axillary and inguinal lymph nodes in brief Practical: Demonstration of heart and vessels in the body
Histology of large artery, medium sized artery & vein, large vein
Microscopic appearance of large artery, medium sized artery & vein, large vein pericardium Histology of lymph node, spleen, tonsil & thymus
Normal chest radiograph showing heart shadows
Normal angiograms

4. **Gastro-intestinal system Theory:**
   Parts of GIT, Oral cavity (lip, tongue (with histology), tonsil, dentition, pharynx, salivary glands, Waldeyer's ring)
   Oesophagus, stomach, small and large intestine, liver, gall bladder, pancreas
   Radiographs of abdomen

5. **Respiratory system**
   Parts of RS, nose, nasal cavity, larynx, trachea, lungs, bronchopulmonary segments Histology of trachea, lung and pleura
   Names of paranasal air sinuses
   Practical: Demonstration of parts of respiratory system. Normal radiographs of chest
   Histology of lung and trachea

6. **Peritoneum**
   Theory: Description in brief
   Practical: Demonstration of reflections

7. **Urinary system**
   Kidney, ureter, urinary bladder, male and female urethra Histology of kidney, ureter and urinary bladder
   Practical: demonstration of parts of urinary system
   Histology of kidney, ureter, urinary bladder
   Radiographs of abdomen-IVP, retrograde cystogram

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

**9. Endocrine glands Theory:**

Names of all endocrine glands in detail on pituitary gland, thyroid gland, parathyroid gland, suprarenal glad - (gross & histology) Practical: Demonstration of the glands Histology of pituitary, thyroid, parathyroid, suprarenal glands

**10.Nervous system**

**Theory:**

Neuron

Classification of NS

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

Meninges, Ventricles & cerebrospinal fluid

Names of basal nuclei

Blood supply of brain

Cranial nerves

Sympathetic trunk & names of parasympathetic ganglia

Practical: Histology of peripheral nerve & optic nerve

Demonstration of all plexuses and nerves in the body

Demonstration of all part of brain

Histology of cerebrum, cerebellum, spinal cord

**Sensory organs:**

**Theory:**

Skin: Skin-histology

Appendages of skin

Eye: parts of eye & lacrimal apparatus

Extra-ocular muscles & nerve supply

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

and contents Practical: Histology of thin and thick

skin Demonstration and histology of eyeball

Histology of cornea & retina

**Embryology**

**Theory:**

Spermatogenesis & oogenesis

Ovulation, fertilization

Fetal circulation

Placenta

**Internal Assessment**

| | |
|---|---|
| Theory - Average of two exams conducted. | 20 |
| Practicals: Record & Lab work* | 10 |

* There shall be no University Practical Examination and internal assessment marks secured in Practicals need not be sent to the University.

**Scheme of Examination Theory**

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

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

1. Long essay- 2 Questions (second question choice) 2x10= 20 marks
2. Short essay- 10 Questions (Questions no 5 &10 choice) 10x5= 50 marks
3. Short answer- 10 Questions (Questions no 15 & 20 choice) 10x3= 30 marks

**Total= 100**

**NO PRACTICAL EXAMINATION**

**REFERENCE BOOKS**

**Anatomy**


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

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

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

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

## PHYSIOLOGY

Theory 70 hours
Practical 20 hours

**Introduction -** composition and function of blood

Red blood cells - Erythropoiesis , stages of differentiation function , count physiological Variation.

Haemoglobin -structure , functions , concentration physiological variation

Methods of Estimation of Hb

White blood cells - Production , function, life span, count, differential count Platelets - Origin, normal count, morphology functions.

Plasma Proteins - Production, concentration , types, albumin, globulin, Fibrinogen, Prothrombin functions.

Haemostasis & Blood coagulation

Haemostasis - Definition, normal haemostasis, clotting factors, mechanism of clotting, disorders of clotting factors.

Blood Bank

Blood groups - ABO system, Rh system

Blood grouping & typing

Crossmatching

Rh system - Rh factor, Rh in compatibility.

Blood transfusion - Indication, universal donor and recipient concept.

Selection criteria of a blood donor. transfusion reactions Anticoagulants - Classification, examplesand uses

Anaemias : Classification - morphological and etilogical. effects of anemia on body

Blood indices - Colour index , MCH, MCV, MCHC

Erythrocyte sedementation Rate (ESR) and Paced cell volume

Normal values, Definition . determination,

Blood Volume -Normal value ,determination of blood volume and regulation of blood volume Body fluid - pH, normal value, regulation and variation

Lymph - lymphoid tissue formation, circulation, composition and function of lymph

**Cardiovascular system**

Heart - Physiological Anatomy, Nerve supply

Properties of Cardiac muscle,

Cardiac cycle-systole,diastole. Intraventricular pressure curves. Cardiac Output - only definition

Heart sounds Normal heart sounds Areas of auscultation.

Blood Pressure - Definition, normal value, clinical measurement of blood pressure. Physiological variations, regulation of heart rate, cardiac shock, hypotension, hypertension. Pulse - Jugalar, radial pulse, Triple response

Heart sounds - Normal heart sounds, cause characteristics and signification. Heart rate Electrocardiogram (ECG) -significance.

Digestive System-Physiological anatomy of Gastro intestinal tract,Functions of digestive system Salivary glands Stucture and functions. Deglutination -stages and regulation

Stomach - structure and fuctions

Gastric secretion - Composition function regulation of gastric juice secretion

Pancrease - structure, function, composition, regulation of pancreatic juice

Liver - functions of liver

Bile secretion, composition, function regulation of bile secretion .Bilirubin metabolism types of bilirubin, 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 scerated, 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-funtions. 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 - Comparision, 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 lead, 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, Cysteurethrogram. 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 reproducive syustem. 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 Practicals need not be sent to the University.

**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 Physiology shall be as given under.

| SUBJECTS HAVING MAXIMUM MARKS= 100 | | | |
|---|---|---|---|
| Type of Questions | No. of Questions | Marks for Each Questions | Total |
| Long Essay | 2 | 10 x2 | 20 |
| Short Essay | 10 | 10 x 5 | 50 |
| Short Answer | 10 | 10 x 3 | 30 |

**Total =100**

Long essay- 2 Questions (second question choice) 2x10= 20 marks

Short essay- 10 Questions (Questions no 5 &10 choice) 10x5= 50 marks

Short answer- 10 Questions (Questions no 15 & 20 choice) 10x3= 30 marks

**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

# BIOCHEMISTRY

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

1.Introduction to Laboratory apparatus
Pipettes- different types (Graduated, volumetric, Pasteur, Automatic etc.,)
2. Calibration of glass pipettes
Burettes, Beakers, Petri dishes, depression plates.
Flasks - different types )Volumetric, round bottmed, Erlemeyer conical etc.,)
Funnels - different types (Conical, Buchner etx.,)
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 Distilation plant and water deionisers. Use, care and maintenance
Refrigerators, cold box, deep freezers - Use, care and maintanance
Reflux condenser : Use, care and maintenance

Centrifuges (Theory and demonstration) Diagrams to be drawn
Definition, Principle, svedberg unit, centrifugal force, centrifugal field rpm, ref. Conversion of G
to rpm and vice versa.
Different types of centrifuges
Use care and maintenance of a centrifuge
Laboratory balances [Theory & Practicals) Diagrams to be
drawn Manual balances: Single pan, double pan, trip
balance Direct read out electrical balances.
Use care and maintenance. Guideline to be followed and precautions to be taken while weighing
Weighing different types of chemicals, liquids. Hygroscopic compounds
etc. Colorimeter and spectrophotometer (Theory and Practicals)
Diagrams to be drawn Principle, Parts Diagram. Use, care and
maintenance.
pH meter (Theory & practicals) Diagrams to be drawn
principle, parts, Types of electrods, 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 f electrons, protons, neutrons, and nucleus, Rutherford's model of atomic structure, Bohr's model of atomic structure, orbit and orbital, Quantum numbers, Heisenberg's uncertainly principle.

Electronic configuration - Aufbau principle, Pauli's exclusion principle, etc.,m
Valency and bonds - different types of strong and weak bonds in detail with examples Theory & Practicals for all the following under this section Molecular weight, equivalent weight of elements and compounds, normality molarity Preparation of molar solutions (mole/litre solution) eg: 1 M Nacl, 0.15 M NaCL 1 M NaOH, 0.1 M HCl, 0.1 M H 2S04 etc.,

preparation of normal solutions. eg., IN Na2CO3, O IN Oxalic acid, 0.1 N HCl, 0.1N H2504,
0.66 N H2S04 etc.,

Percent solutions. Preparation of different solutions - v/v w/v (solids, liquids and acids) Conversion of a percent solution into a molar solution

Dilutions

Diluting solutions: eg. Preparation of 0.1 N NaCl from 1 N NaCl from 2 NHCl etc., Preparing working standard from stock standard, Body fluid dilutions, Reagent dilution techniques,

calculating the dilution of a solution, body fluid reagent etc.,

Saturated and supersaturated solutions.

Standard solutions. Technique for preparation of standard solutions eg: Glucose, urea, etc., Significance of volumetric flask in preparaing standard solutions.

Volumetric flasks of different sizes, Preparation of standard solutions of deliquesent compounds (CaCl2, potassium carbonate, sodium hydroxide etc.,)

Preparation of standards using conventional and Sl units Acids, bases, salts and indicators.

Acids and Bases: Definition, physical and chemical properties with examples.

Arrehenius concept of acids and bases, Lowery - Bronsted theory of acids and bases classification of acids and bases. Different between bases and alkali, acidity and basicity, monoprotonic and polyprotonic acids and bases

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

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

Acid- base indicators: (Theory and Practicals)

Theory - Definition, concept, mechanism of dissociation of an idicator, colour change of an indicator in acidic and basic conditions, use if standard buffer solution and indicators for Ph determinations, preparatin and its application, list of commonly used indicators and their Ph range, suitable pH indicators used in different titrations, universal indicators

Practicals - Titration of a simple acid and a base (Preparation of standard solution of oxalic acid and using this solution finding out the normality of a sodium hydroxide soslution . Acid to be titrated using this base) Calculation of normality of an acid or a base after titration, measurement of hydrogen ion concentration

**Quality control :**Accuracy
Precision
Specificity
Sensitivity
Limits of error allowable in laboratory
Percentage error
Normal values and Interpretations

**Special Investigations :**Serum Electrophoresis
Immunoglobulins
Drugs : Digitoxin, Theophyllines

**Regulation of Acid Base status:**

Henderson Hasselback Equations
Buffers of the fluid
pH Regulation

Disturbance in acid Base Balance
Anion Gap
Metabolic acidosis
Metabolic acidosis
Metabolic alkalosis
Respiratory acidosis
Respiratory alkalosis
Basic Principles and estimation of Blood Gases and pH
Basic principles and estimation of Electrolytes
Water Balance
Sodium regulation
Bicarbonate buffers
Nutrition, Nutritional support with special emphasis on parental nutrition.
Calorific Value
Nitrogen Balance
Respiratory Quotient
Basal metabolic rate
Dietary Fibers
Nutritional importance of lipids, carbohydrates and proteins
Vitamins

**PRACTICALS**

Analysis of Normal Urine
Composition of urine
Procedure for routine screening
Urinary screening for inborn errors of metabolism
Common renal disease
Urinary calculus

Urine examination for detection of abnormal constituents
Interpretation and Diagnosis through charts
Liver Function tests
Lipid Profile
Renal Function test
Cardiac markers
Blood gas and Electrolytes

**4. Estimation of Blood sugar, Blood Urea and electrolytes**

**5. Demonstration of Strips**

Demonstration of Glucometer

**Internal Assessment**

| | |
|---|---|
| Theory - Average of two exams conducted. | 20 |
| Practicals: Record & Lab work* | 10 |

* There shall be no University Practical Examination and internal assessment marks secured in Practicals need not be sent to the University.

**Scheme of Examination Theory**

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

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

Long essay- 2 Questions (second question choice) 2x10= 20 marks
Short essay- 10 Questions (Questions no 5 &10 choice) 10x5= 50 marks
Short answer- 10 Questions (Questions no 15 & 20 choice) 10x3= 30 marks

**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

# 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

- Introduction to Haematology
- Normal constituents of Blood, their structure and function.
- Collection of Blood samples
- Various Anticoagulants used in Haematology
- Various instruments and glassware used in Haematology, Preparation and use of glassware - Laboratory safety guidelines
- SI units and conventional units in Hospital Laboratory

- Hb,PCV
- ESR
- Normal Haemostasis
  Bleeding Time, Clotting Time, Prothrombin Time, Activated Partial Thromboplastin Time.
  Blood Bank
  Introduction
  Blood grouping and Rh Types
  Cross matching

**PRACTICALS**

- Urine Examination.
- Physical
- Chemical
- Microscopic
- Blood Grouping Rh typing.
- Hb Estimation,Packed Cell Volume[PCV], Erythrocyte Sedimentation rate{ESR] - Bleeding Time, Clotting Time.
- Histopathlogy - Section cutting and H &E Staining.[For BSc MLT only ]

**Internal Assessment**

| | |
|---|---|
| Theory - Average of two exams conducted. | 20 |
| Practicals: Record & Lab work* | 10 |

* There shall be no University Practical Examination and internal assessment marks secured in Practicals need not be sent to the University.

**Scheme of Examination Theory**

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

| TYPE OF QUESTION | NUMBER OF QUESTIONS | MARKS | SUB-TOTAL |
|---|---|---|---|
| LONG ESSAY (LE) | 2 | 10 x2 | 20 |
| SHORT ESSAY (SE) | 10 | 10 x 5 | 50 |
| SHORT ANSWER (SA) | 10 | 10 x 3 | 30 |
| TOTAL MARKS | | | 100 |

Long essay- 2 Questions (second question choice) 2x10= 20 marks
Short essay- 10 Questions (Questions no 5 &10 choice) 10x5= 50 marks
Short answer- 10 Questions (Questions no 15 & 20 choice) 10x3= 30 marks

**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. New Delhi-1991.

# MICROBIOLOGY

**Objective :**

This course introduces the principles of Microbiology with emphasis on applied aspects of
Microbiology of infectious diseases particularly in the following areas
Principles & practice of sterilization methods.
Collection and despatch of specimens for routine microbiological investigations.
Interpretation of commonly done bacteriological and serological investigations. Control of Hospital infections
Biomedical waste management
Immunization schedule

**Theory - 70 hours**

1. Morphology 4 hours
   Classification of microorgaisms, 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 sterlization namely Hot Air oven, Autoclave and serum inspissrator. Pasteurization, Anti septic and disinfectants. Antimicrobial sensitivity test

4. Immunology 6 hours
   Immunity Vaccines, Types of Vaccine and immunization schedule Principles and interpretation of commonly done serological tests namely Widal, VDRL, ASLO, CRP, RF & ELISA. Rapid tests for HIV and HbsAg(Technical details to be avoided)

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

6. Parasitology 10 hours
   Morphology, life cycle, laboratory diagnosis of following parasites E. histolytica, Plasmodium, Tape worms, Intestinal nematodes
7. Mycology 4 hours
   Morphology, diseases caused and lab diagnosis of following fungi. Candida, Cryptococcus, Dermatophytes ,opportunistic fungi.

8. Virology 10 hours
   General properties of viruses, diseases caused, lab diagnosis and prevention of following viruses, Herpes, Hepatitis, HIV, Rabies and Poliomyelitis.

9. Hospital infection Causative agents, transmission methods, investigation, prevention and control
   Hospital infection. 4 hours
10. Principles and practice Biomedical waste management 4 hours

**Practical** **20 hours**

Compound Microscope.
Demonstration and sterlization of equipments - Hot Air oven, Autoclave, Bacterial filters.
Demonstration of commonly used culture media, Nutrient broth, Nutrient agar, Blood agar, Chacolate agar, Mac conkey medium, LJ media, Robertson Cooked meat media, Potassium tellurite media with growth, Mac with LF & NLF, NA with staph
Antibiotic susceptibility test
Demonstration of common serological tests - Widal, VRDL, ELISA.
Grams stain
Acid Fast staining
Stool exam for Helminthic ova
Visit to hospital for demonstration of Biomedical waste mangement. Anaerobic culture methods.

**Internal Assessment**

| | |
|---|---|
| Theory - Average of two exams conducted. | 20 |
| Practicals: Record & Lab work* | 10 |

* There shall be no University Practical Examination and internal assessment marks secured in Practicals need not be sent to the University.

**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 Microbiology shall be as given under.

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

Long essay- 2 Questions (second question choice) 2x10= 20 marks
Short essay- 10 Questions (Questions no 5 &10 choice) 10x5= 50 marks
Short answer- 10 Questions (Questions no 15 & 20 choice) 10x3= 30 marks

**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

## Subsidiary Subjects

# ENGLISH

**COURSE OUTLINE**

**COURSE DESCRIPTION:** This course is designed to help the student acquire a good command and comprehension of the English language through individual papers and conferences.

**BEHAVIOURAL OBJECTIVES :**

The student at the end of training is able to

1. Read and comprehend english language
2. Speak and write grammatically correct english
3. Appreciates the value of English literature in personal and professional life.

**UNIT - I : INTRODUCTION :**

Study Techniques
Organisation of effective note taking and logical processes of analysis and synthesis Use of the dictionary Enlargement of vocabulary
Effective diction

**UNIT - II : APPLIED GRAMMAR :**

Correct usage
The structure of sentences
The structure of paragraphs
Enlargements of Vocabulary

**UNIT - III : WRITTEN COMPOSITION :**

Precise writing and 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.

# HEALTH CARE

Teaching Hours : 40

**Introduction to Health**

Definition of Health, Determinants of Health, Health Indicators of India, Health Team Concept. National Health Policy
National Health Programmes ( Briefly Objectives and scope)
Population of India and Family welfare programme in India

**Introduction to Nursing:**

What is Nursing ? Nursing principles. Inter-Personnel relationships. Bandaging : Basic turns; Bandaging extremities; Triangular Bandages and their application.
Nursing Position, Bed making, prone, lateral, dorsal, dorsal re-cumbent, Fowler's positions, comfort measures, Aids and rest and sleep.

Lifting And Transporting Patients: Lifting patients up in the bed. Transferring from bed to wheel chair. Transferring from bed to stretcher.

Bed Side Management: Giving and taking Bed pan, Urinal : Observation of stools, urine. Observation of sputum, Understand use and care of catheters, enema giving.

Methods of Giving Nourishment: Feeding, Tube feeding, drips, transfusion Care of Rubber Goods
Recording of body temperature, respiration and pulse, Simple aseptic technique, sterlization 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.

## SECOND YEAR

### Main Subjects

# APPLIED PHARMACOLOGY

- General concepts about pharmacodynamic and Pharmacokinetics Principles involved in drug activity.

**I. Autonomic nerves system.**

- Anatomy & functional organisation.
- List of drugs acting on 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 cardioplagia.
j. Primary solutions - History, principles & types.
k. Drugs used in the treatment of shock.

**III. Anaesthetic agents.**

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

**IV. Analgesics**

- Definition and classification
- Routes of administration, dose, frequency of administration,
  Side effects and management of non opioid and opiod 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 administrion.

**XII. Chemotherapy of infections**

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

**XIII. Miscellaneous.**

- IV fluids- various preparations and their usage.
- Electrolyte supplements
- Immunosuppressive agents
- New drugs included in perfusion technology.
- Drugs used in metabolic and electrolyte imbalance.

**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 100 marks. Distribution of type of questions and marks for Applied Pharmacology shall be as given under.

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

Long essay- 2 Questions (second question choice) 2x10= 20 marks
Short essay- 10 Questions (Questions no 5 &10 choice) 10x5= 50 marks
Short answer- 10 Questions (Questions no 15 & 20 choice) 10x3= 30 marks

**NO PRACTICAL EXAMINATION**

**Recommended Books.**

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.

1. 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.

2. Laurence and Bennet, Clinical Pharmacology, ELBS Edition, 9th Edition.

# APPLIED PATHOLOGY I

## CARDIOVASCULAR SYSTEM

- Atherosclerosis- Definition, risk factors, briefly Pathogenesis & morphology, clinical significance and prevention.
- Hypertension- Definition, types and briefly Pathogenesis and effects of Hypertension.
- Aneurysms - Definition, classification, Pathology and complications.
- Pathophysiology of Heart failure.
- Cardiac hypertrophy - causes, Pathophysiology & Progression to Heart Failure.
- Ischaemic heart diseases- Definition, Types. Pathophysiology, in brief 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. causes, Pathology & complications of each type of COPD in brief.
- 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 the causes, mechanism, effects and laboratory diagnosis of ARF & CRF. 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 with 2 section of three hours duration carrying 50 marks. each Distribution of type of questions and marks for Applied Pathology shall be as given under.

| TYPE OF QUESTION | NUMBER OF QUESTIONS | MARKS | SUB-TOTAL |
|---|---|---|---|
| LONG ESSAY (LE) | 1 | 1 x 10 | 10 |
| SHORT ESSAY (SE) | 5 | 5 x 5 | 25 |
| SHORT ANSWER (SA) | 5 | 5 x 3 | 15 |
| TOTAL MARKS | | | 50 |

1. Long essay- 1 Questions (No choice) 1x10= 10 marks
2. Short essay- 05 Questions (Choice is in Questions no 3) 05x5= 25 marks
3. Short answer- 05 Questions (Choice is in Questions no 3) 05x3= 15 marks

**Total= 50**

**PRACTICAL EXAMINATION - 40 Marks.**

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

| SL. NO. | TESTS | MARKS |
|---|---|---|
| 01 | Interpretation of Hematology Chart | 05 |
| 02 | Interpretation of Urine Chart | 05 |
| 03 | Estimation of Hemoglobin | 05 |
| 04 | Estimation of Bleeding time & Clotting time | 05 |
| | Total | 20 |

# 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 Clostriduium difficle, 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 synctial virus etc), blood borne transmission ( HIV, Hepatitis B, Hepatitis C, Cytomegalovirus, Ebola virus etc), oro faecal route ( Salmonella, Hepatitis A etc), direct contact ( Herpes Simplex Virus etc). Preventive measures to combat the spread of these infections by monitoring and control.
   6 Hours

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

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

4. Importance of sterilization:
   a. Disinfection of instruments used in patient care: Classification, different methods, advantages and disadvantages of the various methods.
   b. Disinfection of the patient care unit
   c. Infection control measures for ICU's 10 Hours

5. Sterilization:
   a. Rooms: Gaseous sterilization, One Atmosphere Uniform Glow Discharge Plasma (OAUGDP).
   b. Equipments: classification of the instruments and appropriate methods of sterilization.
   c. Central supply srenile 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

7. **PRACTICALS- 30 HOURS**

1. Principles of autoclaving & quality control of Sterilization.
2. Collection of specimen from outpatient units, inpatient units, minor operation theatre and major operation theatre for sterility testing.
3. The various methods employed for sterility testing.
4. Interpretation of results of sterility testing.
5. Disinfection of wards, OT and Laboratory.

**Scheme of Examination**

**Theory**

There shall be one theory paper with 2 section of three hours duration carrying 50 marks. Distribution of type of questions and marks for Applied Microbiology shall be as given under.

| TYPE OF QUESTION | NUMBER OF QUESTIONS | MARKS | SUB-TOTAL |
|---|---|---|---|
| LONG ESSAY (LE) | 1 | 1 x 10 | 10 |
| SHORT ESSAY (SE) | 5 | 5 x 5 | 25 |
| SHORT ANSWER (SA) | 5 | 5 x 3 | 15 |
| TOTAL MARKS | | | 50 |

1. Long essay- 1 Questions (No choice) 1x10= 10 marks
2. Short essay- 05 Questions (Choice is in Questions no 3) 5x5= 25 marks
3. Short answer- 05 Questions (Choice is in Questions no 3) 5x3= 15 marks

**Total= 50**

**PRACTICAL EXAMINATION - 40 Marks.**

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

| Sl. No. | Tests | Marks |
|---|---|---|
| 1. | Dry heat / Moist heat: Temperature recording charts interpretation | 05 |
| 2. | Dry heat / Moist heat: Color change indicators interpretation | 05 |
| 3. | Air sampling culture plates interpretation of Colony forming units based on air flow rate and sampling time | 05 |
| 4. | 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 | 05 |
| | Total | 20 |

# MEDICINE RELEVANT TO OPERATION THEATRE TECHNOLOGUY

Diabetes Mellitus
Hypertension
Ischaemic heart disease
Obesity
Elderly Patient
Pregnancy
Shock
COPD
Chronic renal failure
Chronic liver disease/failure
Anaemia
Pediatric patient Infant/Neonate
Epilepsy
CVA

**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 Medicine relevant to Operation Theatre Technology shall be as given under.

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

Long essay- 2 Questions (second question choice) 2x10= 20 marks
Short essay- 10 Questions (Questions no 5 &10 choice) 10x5= 50 marks
Short answer- 10 Questions (Questions no1 5 & 20 choice) 10x3= 30 marks

**Total= 100**

**NO PRACTICAL EXAMINATION**

# INTRODUCTION TO OPERATION THEATRE TECHNOLOGUY

1. C.S.S.D, and logistics
   Cleaning and dusting - methods of cleaning, composition of dust.
   General care and testing of instruments- haemostatic forcaps , needle, holders, Knife, blade, scissor, use/ abuse, care during surgery.

   Disinfectants of instruments and Sterilization- Definition, Methods cleaning agents detergents, Mechanical washing, ultrasonic cleaner, lubrication inspection and pitfalls

   Various methods of chemical treatment- formalin, glutaraldchyde etc, thermal. Hot Air oven- dry heat, Autoclaving, steam Sterilization water etc,. UV treatment.

   Instrument's Etching, care of micro surgical and titanium instruments

   Sterilization of equipments - Arthroscope, Gastroscope, imago Lamp, Apparatus, suction Apparatus Anaesthetic equipments including endotracheal tubes -

   OT Sterilization including Laminar Air flow

   Trouble shooting - colored spots and corrosion, staining, dust deposit, recent amendment in EPA with reference to waste disposal.

2. Anaesthesia Service, History, pre-operative, Intra operative & post operative care
3. General Anaesthesia Techniques
4. Local Anaesthesia Techniques
5. Blood Transfusion
6. Monitoring in the Operation Theatre
7. Positioning of Patient
8. Instrument planning for various surgical procedure and Auxillary instrumentation.
9. O.T. Techniques
   O.T. environment, control of infection scrubbing, theatre cloths including lead apron and goggles.
10. Duties of Nurses - Ethics, behaviour during surgery, etc,.

**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 Operation Theatre Technology shall be as given under.

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

Long essay- 2 Questions (second question choice) 2x10= 20 marks

Short essay- 10 Questions (Questions no 5 &10 choice) 10x5= 50 marks

Short answer- 10 Questions (Questions no1 5 & 20 choice) 10x3= 30 marks

**Total= 100**

**PRACTICAL EXAMINATION - 40 Marks**

# 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

**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

# INDIAN CONSTITUTION

Prescribed for the First Year students of all degree classes

**Unit-I:**
Meaning of the team 'Constitution' making of the Indian Constitution 1946-1940.

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

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

**Unit - 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 Sciences And Health

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

**Recommended Books.**


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

## Third Year
## Main Subjects

## Paper-I OPERATION THEATRE TECHNOLOGY - CLINICAL

Physical Facility
Layout of Operation theatres
Transition
Peripheral Support areas
Operating room
Special procedure rooms
Potential sources of injury to the caregiver & patient

Principles of aspects & sterile technologies
Astilse, surgical scrub, gowning & gloving
Decontamination & disinfections
Sterilization Assembly & packing
Thermal sterilization
Chemical sterilization
Radiation sterilization
Surgical instrumentation
Fabrication
Classification
Powered surgical instruments
Handling instruments

Specialized surgical equipment
Electro catheter
Laser
Microsurgery
Ultrasonography

Positioning prepping and draping the patient General surgery
Breast procedures
Abdominal surgery
Liver Procedures
Splenic procedures
Pancreatic Procedures
Oesophagial

**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 Operation Theatre Technology - Clinical shall be as given under.

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

Long essay- 2 Questions (second question choice) 2x10= 20 marks
Short essay- 10 Questions (Questions no 5 &10 choice) 10x5= 50 marks
Short answer- 10 Questions (Questions no 15 & 20 choice) 10x3= 30 marks

**Total= 100**

**PRACTICAL EXAMINATION**

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

## Paper-II OPERATION THEATRE TECHNOLOGY - APPLIED

Preoperative preparation of the patient
Diagnostic procedures
Pathological examination
Radiological examination
MRI
Nuclear medicine studies
Ultrasonography
Endoscopy

Anaesthesia techniques
Historical background
Types of Anaesthesia
Choice of Anaesthesia
General Anaesthesia
Indication of general anaesthesia
Endotracheal intubation
Maintenance
Monitoring
Emergency
Balanced Anaesthesia
Core of Anaesthetized patient
Local & regional anaesthesia
Spinal and epidural anaesthesia
Intravenous anaesthesia agents
In halational anaesthetic agents
Anaesthetic Adjuvant drugs
Complication of general anaesthesia
Complication of local/regional anaesthesia
Blood transfusion
Anaesthesia Machine & central gas supply
Difficult intubation

**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 Operation Theatre Technology - Applied shall be as given under.

| TYPE OF QUESTION | NUMBER OF QUESTIONS | MARKS | SUB-TOTAL |
|---|---|---|---|
| LONG ESSAY (LE) | 2 | 2 x 10 | 20 |
| SHORT ESSAY (SE) | 10 | 10 x 5 | 50 |
| SHORT ANSWER (SA) | 10 | 10 x 3 | 30 |
| GRAND TOTAL | | | 100 |

Long essay- 2 Questions (second question choice) 2x10= 20 marks
Short essay- 10 Questions (Questions no 5 &10 choice) 10x5= 50 marks
Short answer- 10 Questions (Questions no 15 & 20 choice) 10x3= 30 marks

**Total= 100**

**PRACTICAL EXAMINATION**

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

# Paper-III Operation Theatre Technology - Advanced

**Operation Theatre Techniques for Speciality Surgery:-**

Preparation, nursing requirement, equipments including instruments, Sutures & etc Anaesthesia techniques, patient positioning & recovery
Gynecological /obstetric surgery Urologic surgery
Orthopedic surgery
Neurosurgery
Ophthalmic surgery
Plastic and reconstructive surgery
Otorhinolaryngologic and head and neck surgery
Thoracic surgrey
Cardiac surgery
Vascular surgery
Organ procurement and transplantation
Thyroid surgery

**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 -Operation Theatre Technology - Advanced shall be as given under.

| TYPE OF QUESTION | NUMBER OF QUESTIONS | MARKS | SUB-TOTAL |
|---|---|---|---|
| LONG ESSAY (LE) | 2 | 2 x 10 | 20 |
| SHORT ESSAY (SE) | 10 | 10 x 5 | 50 |
| SHORT ANSWER (SA) | 10 | 10 x 3 | 30 |
| GRAND TOTAL | | | 100 |

Long essay- 2 Questions (second question choice) 2x10= 20 marks
Short essay- 10 Questions (Questions no 5 &10 choice) 10x5= 50 marks
Short answer- 10 Questions (Questions no 15 & 20 choice) 10x3= 30 marks

**Total= 100**

**PRACTICAL EXAMINATION**

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

# Subsidiary Subjects

## 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 calculaton 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 dispression.
The range, the average deviation.
The variance and standard deviation.
Calculation of variance and standard deviation ungrouped and grouped. Properties and uses of variance and SO

**Unit -V : Probability and Standard Distributions.**

Meaning of probability of standard distribution.
The Binominal distribution.
The normal distribution.
Divergen

**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.

## BASICS IN COMPUTER APPLICATIONS

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

**Introduction to Data processing :**

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

**Hardware Concepts :**

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

**Concept of Software.**

Classification of software : System software. Application of software. Operating 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

# CLINICAL TRAINING

**Content and purpose**

The clinical component has been designed to complement the academic program and runs throughout the course. The placement have to be designed so that the students will be able to observe the practical application of the academic course wherever possible. Content can be tailored to meet either National or Local needs as is deemed to be most appropriate.

**1st year : Introduction to the Hospital Setting The purpose of this phase is :**

i. For the students to become familiar with some of the practical applications of the academic course ii. To introduce the wider hospital setting

iii. To help the students to identify the various disciplines within a hospital, their role and the importance of cooperation.

iv. To introduce patients in a clinical setting and begin to acquire basic communication skills.

**2nd year : Skills Necessary to work in a Hospital**

To be completed very early in the training. The following procedures will be demonstrated to the students who will be expected to observe or participate as appropriate.

**General procedures to be observed when patients attend for appointment :**

- Lifting and moving techniques.
- Administration of bedpans, vomit bowls, etc.,
- Care and management of drugs in the hospital setting.

**Correct procedures when dealing with patients with infectious diseases**

- University precautions.

**Correct procedures when dealing with immuno-compromised patients :**

- Hygiene practices
- Simple dressings
- Sterile procedures
- Oxygen administration

**Care of patients with :**

- Breathing difficulties
- Terminal illness
- Mental impairment
- Physical disability

- Special care of the geriatric and pediatric patient
- Stoma care
- Handling of patients with bone metastases
- Care of the patient following an anaesthetic
- Care of lines in the incubated patient
- Communication skills with patients and relatives
- Terminally ill and Hospice

**2nd & 3rd year : Skills Related to working in a department**

Introduction to the department. Time will be spent on each unit within the department. The purpose of this phase is to :

**In the department :**

i. Familiarize the students with the different units within the department and the procedures carried out on each unit.

ii. Enable the student to recognize and relate to the basic terminology introduced in the academic program.

iii. Help to establish a sense of identity within the student group and to understand the role of the Technology in the management of various cases. iv. Introduce the students to the staff of the department.

v. Help the student to understand team roles.

vi. Familiarize the students with written QA programs within the department.

**Equipment's and Integration :**

i. Begin to become competent in the manipulation of the equipment.
ii. Be able to communicate effectively with patients. iii. Begin to integrate into the department as part in specific and multidisciplinary teams. iv. Begin to empathize with patients and to appreciate their own feelings in the clinical situation. v. Being able to handle and achieve proficiency in mould room techniques.

**Safety & Precautions in Practice :**

i. Identifying the functions of various equipment and safe handling. ii. Identifying the functions on a control panel, indicating their purpose and safely using these when appropriate.
iii. Safely using the accessory equipment in the correct context. iv. Correctly and safely using equipment related to

patient immobilization. v. Demonstrating the correct procedure for various techniques

**To Achieve Clinical Competence**
**The purpose of this phase is for the students to :**

i. Demonstrate competence in the manipulation of equipment. ii. Demonstrate an ability to anticipate the physical and psychological needs of the patient and respond to them. iii. Demonstrate the ability to communicate with ease with other staff involved in the multidisciplinary treatment of the patient.
iv. Increasingly participate as a team member in all aspects of the patient's management. v. Demonstrate competence in simulator procedures.
vi. Acquire basic computer skills. vii. Participate in the development / revision of formal written quality assurance procedures / programme. viii.Set up a patient on their first visit.

**To achieve final competency substantial time will be spent :**

i. Setting up multi field techniques under supervision.
ii. Participating in the quality control procedures in the department in accordance with the protocols. iii. Simulating and localizing a target volume. iv. Discussing the role of local rules and outline those in place in the different departments.

**Graded Responsibility (structured training schedule)**

**I year :** Theory classes, observation in treatment planning and treatment execution.

**II year :** Theory classes, participation in OPD, mould room techniques, treatment planning, treatment execution under the supervision of consultant, senior technologist, project work.

**III year :** Theory classes, participation in OPD, Treatment planning and execution under supervision of consultant & Senior Technologist. Submission of Project Work, Mould Room Techniques, Quality Assurance.

**Rotation posting**

Students may be posted to other relevant departments or other centers with better and latest equipment's for a minimum period of 1 to 2 months, for completion of training in recent advance in the specialty. The student on completion of the training shall submit a report duly signed by the concerned department to the HOD.

**Monitoring Learning Progress**

It is essential to monitor the learning progress of each candidate through continuous appraisal and regular assessment. It not only also helps teachers to evaluate students but also students to evaluate themselves. The monitoring be done by the staff of the department based on participation of students in various teaching / learning activities. It may be structured and assessment be done using sample checklist provided (Assessment forms).

**The learning out comes to be assessed should included :**

i. Personal Attitudes ii. Acquisition of knowledge iii. Clinical and operative skills iv. Teaching skills

**Candidate should be encouraged to participate in teaching activities, seminars and literature reviews.**

**1. Periodic tests :**

The departments may conductperiodic tests (Internal Assessment), the tests may include written papers, practical with viva voce.

Work diary / Log, Personal Atitudes.

**The essential items are :**

- Caring attitudes
- Initiative
- Organizational ability
- Potential to cope with stressful situations and undertake responsibility
- Trust worthiness and reliability
- To understand and communicate intelligibly with patients and other
- To behave in manner which establishes professional relationships with patients and colleagues
- Ability to work in team
- A critical enquiring approach to the acquisition of knowledge the methods used mainly consist of observation. It is appreciated that these items require a degree subjective assessment by the guide, supervisors and peers.

**3. Acquisition of Knowledge :**

The methods used comprise of 'Log Book' which records participation in various teaching / learning activities by the students. The number of activities attended and the number in which presentations are made are to be recorded. The log book should periodically be validated by the supervisors, some of the activities are listed.

The list is not complete. Institutions may include additional activities, if so, desired.

**4. Technical skills**

Day to day work : Skills on the machines should be assessed periodically. The assessment should include the candidates' sincerity and punctuality, analytical ability and communication skills.
Clinical and procedural skills : The candidate should be given graded responsibility to enable learning by apprenticeship. The performance is assessed by the guide by direct observation. Particulars are recorded by the student in the log book.

**5. Teaching Skills :**

**Book :**
Every candidate shall maintain a work diary and record his / her participation in the training programs conducted by the department such as practical, literature reviews, seminars, etc. Special mention may be made of the presentations, by the candidate as well as details of practical or laboratory procedures, if any conducted by the candidate.

**6. Records :**

Records, log books, project report and marks obtained in tests will be maintained by the Head of the Department and will be made available to the University as indicated. The record books maintained by the student should be submitted to the Head of the Department 6 months prior to completion of the course and the head of the department makes a certification of the of the academic progress an assessment of student performance through out the said course shall be made by the HOD.

The log book is a record of the important activities of the candidates during his training internal assessment should be based on the evaluation of the log book collectively, log books are a tool for the evaluation of the training programme of the institution by external agencies. The record includes academic activities as well as the presentations and procedures carried out by the candidate.