

**Revised Ordinance Governing Regulations and
Curriculum**

of

B.Sc. NEUROSCIENCE 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.NEU.SCI./364/2019-20

Date: 28/08/2019

NOTIFICATION

Sub: Revised Ordinance pertaining to Regulation and Curriculum of B.Sc. Neuro Science 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. Neuro Science Technology is notified herewith as per Annexure.

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

By Order,

Sd/-

REGISTRAR

To

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

Copy to :

1. The Principal Secretary to Governor, Raj Bhavan, Bangalore - 560001
2. The Principal Secretary Medical Education, Health & Family Welfare Dept., M S Building, Dr.B.R. Ambedkar Veedhi, Bangalore – 01
3. PA to Vice – Chancellor/PA to Registrar/Registrar (Eva.)/Finance Officer, Rajiv Gandhi University Health Sciences, Bangalore

4. All Officers of the University Examination Branch/ Academic Section.
5. Guard File / Office copy.

REVISED ORDINANCE GOVERNING REGULATIONS & CURRICULUM OF B.Sc. NEURO SCIENCE TECHNOLOGY - 2019

1. Eligibility for admission:

A candidate seeking admission to the BSc. Neuro Science Technology shall have studied English as one of the principal subject during the tenure of the course and shall have passed:

1. Two year Pre-University examination or equivalent as recognized by Rajiv Gandhi University of

Health Sciences with, Physics, Chemistry and Biology as subjects of study.

OR

2. Pre-Degree course from a recognized University considered as equivalent by RGUHS, (Two years

after ten years of schooling) with Physics, Chemistry and Biology as subjects of study.

OR

3. Any equivalent examination recognized by the Rajiv Gandhi University of Health Sciences,

Bangalore for the above purpose with Physics, Chemistry and Biology as subjects of study.

OR

4. The vocational higher secondary education course conducted by Vocational Higher Secondary

Education, Government of Kerala with five subjects including Physics, Chemistry, Biology and

English in addition to vocational subjects conducted is considered equivalent to plus TWO

examinations of Government of Karnataka Pre University Course.

OR

5. Candidates with two years diploma from a recognized Government Board in Neuro ScienceTechnology shall have passed class 12 [10+2] with Physics, Chemistry and Biology, as subjects or candidates with 3 years diploma from a recognized Government Board in Neuro ScienceTechnology should have studied Physics, Biology and Chemistry as subjects during the tenure of the course.

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

Note:

- a. The candidate shall have passed individually in each of the subjects.
- b. Candidates who have completed diploma or vocational course through Correspondence shall not be eligible for any of the courses mentioned above.

2. Duration of the course:

Duration shall be for a period of four years including one year of Internship.

3. Medium of instruction:

The medium of instruction and examination shall be in English.

4. Scheme of examination:

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

5. Attendance

Every candidate should have attended at least 80% of the total number of classes conducted in an academic year from the date of commencement of the term to the last working day as notified by university in each of the subjects prescribed for that year separately in theory and practical. Only such candidates are eligible to appear for the university examinations in their first attempt. Special classes conducted for any purpose shall not be considered for the calculation of percentage of attendance for eligibility. A candidate lacking in prescribed percentage of attendance in any subjects either in theory or practical in the first appearance will not be eligible to appear for the University Examination in that subject

6. Internal Assessment (IA):

1st Year B.Sc. NEUROSCIENCE TECHNOLOGY

Theory - 20 marks

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

2nd & 3rd year B.Sc. NEUROSCIENCE TECHNOLOGY

Theory – 20 Marks

Practicals – 20 Marks

There shall be a minimum of two periodical tests preferably one in each term in theory and practical of each subject in an academic year. The average marks of the two tests will be calculated and reduced to 20. The marks of IA shall be communicated to the University at least 15 days before the commencement of the University examination. The University shall have access to the records of such periodical tests. The marks of the internal assessment must be displayed on the notice board of the respective colleges within a fortnight from the date test is held. If a candidate is absent for any one of the tests due to genuine and satisfactory reasons, such a candidate may be given a re-test within a fortnight.

* There shall be no University Practical Examination in First year.

7. Subject and hours of teaching for Theory and Practicals

The number of hours of teaching theory and practical, subject wise in first year, second year and third year are shown in Table-I, Table-II and Table-III

Main and Subsidiary subjects are common in first year for all the courses in Allied Health Science.

The number of hours for teaching theory and practical for main subjects in first, Second and Third year are shown in Table-I, II and III.

Table - 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, Haematology & 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

Clinical/Lab posting –470 hours (Friday 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 Postings	Total No. of Hours
1	Basic Electroencephalography	70	30 (15+15)	--	100
2	Basics of Nerve Conduction Study (NCS)	70	30 (15+15)	-	100
3	Applied Anatomy & Physiology Related to Neuroscience Technology	70	30 (15+15)	-	100
4	Pharmacology related to Neuroscience technology	50	-	--	50
	Total	260	90		350

Subsidiary Subjects:

Medical Psychology

20Hours

Table - III Distribution of Teaching Hours in Third Year Subjects**Main Subjects**

Sl. no	Subjects	Theory No. of Hours	Practical No. of Hours	Clinical Posting	Total No. of Hours
1	Advanced Technique I	70	30	310	410
2	Advanced Technique II	70	30	310	410
3	Systemic Disease	50			50
	Total	190	60	620	870

Subsidiary Subjects:

8. Schedule of Examination:

The university shall conduct two examinations annually at an interval of not less than 4 to 6 months as notified by the university from time to time. A candidate who satisfies the requirement of attendance, progress and conduct as stipulated by the university shall be eligible to appear for the university examination. Certificate to that effect shall be produced from the Head of the institution along with the application for examination and the prescribed fee.

9. Scheme of Examination

There shall be three examinations, one each at the end of I, II and III year. The examination for both main and subsidiary subjects for all courses in Allied Health Sciences shall be common in the first year. Distribution of Subjects and marks for First Year, Second year & Third year University theory and practical Examinations are shown in the Table – IV, V & VI.

First year examination:

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

Second & Third year examination:

The University examination for 2nd and 3rd year shall consist of Written Examination & Practical.

Written Examinations consists of

03 papers in the 2nd Year

03 papers in the 3rd Year.

Practical examination:

Three practical examinations, at the end 2nd Year and three practical examinations at the end of the 3rd year.

TABLE-IV

**Distribution of Subjects and marks for First Year University theory Examination
B.Sc. NEUROSCIENCE TECHNOLOGY**

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	3 Hours	80	20	100
5	Microbiology	3 Hours	80	20	100
	Subsidiary Subject**				
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 of B.Sc. NEUROSCIENCE TECHNOLOGY**

Paper	Subject	Theory			Practicals			Grand Total
		Univ. exam	IA	Sub Total	Univ. Prac	IA	Sub Total	
I	Basic Electroencephalography (EEG)	80	20	100	80 (40+40)	20 (10+10)	100	300
II	Basic Nerve Conduction Study (NCS)	80	20	100				
III	Applied Anatomy & Physiology Related to Neuroscience	80	20	100	No Practical	--	--	100
IV	Pharmacology	80	20	100	No Practical	--	--	100

**Practical-One common practical for the two papers with equal weightage of marks i.e.40 practical mark and 10 I.A .marks for each paper.

Distribution of Subsidiary Subjects and marks for Second Year Examination of B.Sc. NEUROSCIENCE TECHNOLOGY

B	Subsidiary Subject**	Duration	Marks	I A Theory Marks	Total Marks
1	Medical Psychology	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 of B.Sc NEUROSCIENCE TECHNOLOGY

Paper	Subject	Theory			Practical			Grand Total
		Univ. exam	IA	Sub Total	Univ. Prac	IA	Sub Total	
I	Advanced Technique 1	80	20	100	80 (40 + 40)	20 (10+10)	100	300
II	Advanced Technique 2	80	20	100				
III	Systemic Diseases	80	20	100	No practical			100

**Distribution of Subsidiary Subjects and marks for Third Year Examination of
B.Sc. NEUROSCIENCE TECHNOLOGY**

B	Subsidiary Subject**	Duration	Marks	I A Theory Marks	Total Marks
1	Research & Biostatistics	3 Hours	80	20	100

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

10. Pass criteria

10.1. First year examination

a. Main Subjects: A candidate is declared to have passed in a subject, if he/she secures, 50% of marks in University Theory exam and internal assessment added together.

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

10.2. Second and Third year Examination

a. Main Subjects: A candidate is declared to have passed the examination in a subject if he/she secures 50% of the marks in Theory and 50% in practical separately. For a pass in theory, a candidate has to secure a minimum of 40% marks in the University conducted written examination, and 50% in aggregate in the University conducted written examination and internal assessment added together and for pass in Practical, a candidate has to secure a minimum of 40% marks in the university conducted Practical/Clinical examination and 50% in aggregate i.e. University conducted Practical/Clinical and Internal Assessment.

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

11. Carry over benefit

11.1 First year examination:

A candidate who fails in any two of the five main subjects of first year shall be permitted to carry over those subjects to second year. However, he/ she must pass the carry over subjects before appearing for second year examination.

11.2. Second year examination:

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

12. Declaration of Class

a. A candidate having appeared in all the subjects in the same examination and passed that examination in the first attempt and secures 75% of marks or more of grand total marks prescribed will be declared to have passed the examination with Distinction.

b. A candidate having appeared in all subjects in the same examination and passed that examination in the first attempt and secures 60% of marks or more but less than 75% of grand total marks prescribed will be declared to have passed the examination in First Class.

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

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

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

[Please note, fraction of marks should not be rounded off clauses (a), (b) and (c)]

13. Eligibility for the award of Degree:

A candidate shall have passed in all the subjects of first, second and third year to be eligible for a compulsory six months of rotational internship. On completion of six months of the internship the candidate is then eligible for the award of degree.

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

THEORY

SUBJECTS HAVING MAXIMUM MARKS= 100		
Type of Questions	No. of Questions	Marks for Each Questions
Essay Type	3 (2 x 10)	10
Short Essay Type	12 (10 x 5)	05
Short Answer Type	12 (10 x 3)	03

SUBJECTS HAVING MAXIMUM MARKS= 80 (for first year B.Sc.)		
Type of Questions	NO. of questions	Marks for Each Questions
Short Essay Type	10 (8 x 5)	40
Short Answer Type	12 (10 x 3)	30
To The Point Answer	07 (5 x 2)	10

SUBJECTS HAVING MAXIMUM MARKS= 80 (for second and third year B.Sc.)		
Type of Questions	No. of Questions	Marks for Each Questions
Essay Type	3 (2 x 10)	10
Short Essay Type	8 (6 x 5)	05
Short Answer Type	12 (10 x 3)	03

SUBJECTS HAVING MAXIMUM MARKS= 60		
Type of Questions	No. of Questions	Marks for Each Questions
Essay Type	3 (2 x 10)	10
Short Essay Type	7 (5 x 5)	05
Short Answer Type	7 (5 x 3)	03

SUBJECTS HAVING MAXIMUM MARKS= 50		
Type of Questions	No. of Questions	Marks for Each Questions
Essay Type	3 (2 x 10)	10
Short Essay Type	5 (3 x 5)	05
Short Answer Type	7 (5 x 3)	03

INTERNSHIP

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

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

FIRST YEAR B.Sc. NEUROSCIENCE TECHNOLOGY

ANATOMY

No. of theory classes: 70 hours

No. of practical classes: 20 hours

1. Introduction: human body as a whole

Theory:

Definition of anatomy and its divisions

Terms of location, positions and planes

Cell and its organelles

Epithelium-definition, classification, describe with examples, function

Glands- classification, describe serous & mucous glands with examples

Basic tissues – classification with examples

Practical:

Histology of types of epithelium

Histology of serous, mucous & mixed salivary gland

2. Locomotion and support

Theory:

Cartilage – types with example & histology

Bone – Classification, names of bone cells, parts of long bone, microscopy of compact

bone, names of all bones, vertebral column, intervertebral disc, fontanelles of fetal skull

Joints – Classification of joints with examples, synovial joint (in detail for radiology)

Muscular system: Classification of muscular tissue & histology

Names of muscles of the body

Practical:

Histology of the 3 types of cartilage

Demo of all bones showing parts, radiographs of normal bones & joints

Histology of compact bone (TS & LS)

Demonstration of all muscles of the body

Histology of skeletal (TS & LS), smooth & cardiac muscle

3. Cardiovascular system

Theory:

Heart-size, location, chambers, exterior & interior

Blood supply of heart

Systemic & pulmonary circulation

Branches of aorta, common carotid artery, subclavian artery, axillary artery, brachial artery,

superficial palmar arch, femoral artery, internal iliac artery

Peripheral pulse

Inferior venacava, portal vein, portosystemic anastomosis

Great saphenous vein

Dural venous sinuses

Lymphatic system- cisterna chyli& thoracic duct

Histology of lymphatic tissues

Names of regional lymphatics, axillary and inguinal lymph nodes in brief

Practical:

Demonstration of heart and vessels in the body

Histology of large artery, medium sized artery & vein, large vein

Microscopic appearance of large artery, medium sized artery & vein, large vein pericardium

Histology of lymph node, spleen, tonsil & thymus
Normal chest radiograph showing heart shadows
Normal angiograms

4. Gastro-intestinal system

Theory:

Parts of GIT, Oral cavity (lip, tongue (with histology), tonsil, dentition, pharynx, salivary glands, Waldeyer's ring)
Oesophagus, stomach, small and large intestine, liver, gall bladder, pancreas
Radiographs of abdomen

5. Respiratory system

Theory:

Parts of RS, nose, nasal cavity, larynx, trachea, lungs, bronchopulmonary segments

Histology of trachea, lung and pleura

Names of paranasal air sinuses

Practical:

Demonstration of parts of respiratory system.

Normal radiographs of chest

Histology of lung and trachea

6. Peritoneum

Theory: Description in brief

Practical:

Demonstration of reflections

7. Urinary system

Kidney, ureter, urinary bladder, male and female urethra

Histology of kidney, ureter and urinary bladder

Practical: demonstration of parts of urinary system

Histology of kidney, ureter, urinary bladder

Radiographs of abdomen-IVP, retrograde cystogram

8. Reproductive system

Theory:

Parts of male reproductive system, testis, vas deferens, epididymis, prostate (gross & histology)

Parts of female reproductive system, uterus, fallopian tubes, ovary (gross & histology)

Mammary gland – gross

Practical: demonstration of section of male and female pelvis with organs in situ
Histology of testis, vas deferens, epididymis, prostate, uterus, fallopian tubes, ovary

Radiographs of pelvis – hysterosalpingogram

9. Endocrine glands

Theory:

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

Practical: Demonstration of the glands

Histology of pituitary, thyroid, parathyroid, suprarenal glands

10. Nervous system

Theory: Neuron

Classification of NS

Cerebrum, cerebellum, midbrain, pons, medulla oblongata, spinal cord with spinal nerve

(gross & histology)

Meninges, Ventricles & cerebrospinal fluid

Names of basal nuclei

Blood supply of brain

Cranial nerves

Sympathetic trunk & names of parasympathetic ganglia

Practical: Histology of peripheral nerve & optic nerve

Demonstration of all plexuses and nerves in the body

Demonstration of all part of brain

Histology of cerebrum, cerebellum, spinal cord

Sensory organs:

Theory:

Skin: Skin-histology

Appendages of skin

Eye: Parts of eye & lacrimal apparatus

Extra-ocular muscles & nerve supply

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

Practical: Histology of thin and thick skin

Demonstration and histology of eyeball

Histology of cornea & retina

Embryology:

Theory:

Spermatogenesis & oogenesis
 Ovulation, fertilization
 Fetal circulation
 Placenta

INTERNAL ASSESSMENT

Theory-average of 2 exams conducted 20
 Practicals: record and lab work* 10

*There shall be no university practical examination and internal assessment marks secured in Practicals need not be sent to the university.

SCHEME OF EXAMINATION THEORY

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

TYPE OF QUESTION	NUMBER OF QUESTIONS	MARKS	SUB-TOTAL
Short essay type	10 (attempt 8)	8 x 5	40
Short answer type	12 (attempt 10)	10 x 3	30
To the point answer	07 (attempt 5)	5 x 2	10
GRAND TOTAL			80

Distribution of Marks for University Theory and Practical Exam

Theory				Practicals			Grand total
Theory	Viva Voce	IA	Sub Total	Practicals	IA	Sub Total	
80	-	20	100	*			100

REFERENCE BOOKS:

1. William Davis (P) understanding Human Anatomy and Physiology – McGraw Hill
2. Chaurasia- A Text Book of Anatomy
3. T. S. Ranganathan- A Text Book of Human Anatomy
4. Fattana, Human Anatomy (Description and applied)- Saunder’s& C P Prism Publishers, Bangalore
5. ESTER. M. Grishcimer- Physiology & Anatomy with Practical Considerations, J. P. Lippincott. Philadelphia
6. Bhatnagar- Essentials of Human Embryology- Revised Edition. Orient Blackswan Pvt. Ltd.

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, function, concentration physiological variation, White blood cells . types& functions & immunity.

Platelets — Normal count, functions.

Plasma Proteins — Concentration, types, albumin, globulin, Fibrinogen, Prothrombin functions.

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

Blood Bank

Blood groups — ABO system, Rh system Blood grouping & typing

Crossmatching

Rh system — Rh factor, Rh incompatibility.

Blood transfusion — Indication, universal donor and recipient concept.

Selection criteria of a blood donor. Transfusion reactions

Anticoagulants — Classification, examples and uses

Anaemias : Classification — morphological and etiological. Effects of anemia on body

Blood indices — Colour index, MCH, MCV, MCHC

Erythrocyte sedimentation Rate (ESR) and Packed cell volume

Normal values, Definition. Determination

Lymph

Body fluid compartments, function of lymph

1.Cardiovascular system

Heart ~ Properties of Cardiac muscle

Cardiac cycle-systole, diastole

Cardiac Output — Definition & Normal value

Heart sounds- Normal heart sounds Areas of auscultation, Causes

Blood Pressure — Definition, normal value, Physiological variations, regulation of BP, cardiac shock, hypotension, hypertension. Triple response

Electrocardiogram (ECG) —significance.

2.Digestive System - Physiological anatomy of Gastro intestinal tract

Salivary glands - Functions

Deglutition —stages

Stomach — Functions

Gastric secretion – Composition, function,phases of gastric secretion.

Pancreas — Function, composition of pancreatic juice.

Liver — functions of liver.

Bile composition, bile salts function, Bilirubin metabolism, types of bilirubin, Vandernberg reaction, Jaundice- types, significance.

Gall bladder — functions.

Intestine — small intestine and large intestine.

Digestion and absorption of Carbohydrates, Proteins, Fats, Lipids.

3.Respiratory system

Functions of Respiratory system, Physiological Anatomy of Respiratory system, Respiratory tract,

Respiratory Muscles, Respiratory organ-lungs, Alveoli, Respiratory membrane, stages of respiration.

Mechanism of normal intra pulmonary / pleural pressure, surfactant.

Transportation of Respiratory gases: Transportation of Oxygen: Direction, pressure gradient, Forms of transportation, Oxy-Hb dissociation curve. Quantity of Oxygen transported. CO₂ transport forms, chloride shift.

Spirogram - Lung volumes and capacities. Regulation of respiration what? Why? How? Mechanisms of Regulation, nervous and chemical regulation. Respiratory centre.

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

4. Endocrine System —

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

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

Pituitary hormones — Anterior and posterior pituitary hormones, function.

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

5. Special senses

Vision — structure of eye. Function of different parts.

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

Hearing structure and mechanism of hearing

Functions of middle ear.

Taste — Taste buds functions.

Smell physiology, Receptors.

6. Nervous system

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

Receptors — Definition, enumerate properties. Reflex action — unconditioned properties of reflex action. Spinal cord nerve tracts. Name of the pathway & its function, course not needed.

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

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

lumbar puncture.

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

7.Excretory System

Excretory organs

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

Mechanism of Urine formation: Define of GFR, Normal value, factors affecting GFR, Determination. Determination of GFR — sites & mechanism of reabsorption, Na⁺, H₂O, Glucose.

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

Micturition, innervation of Bladder, Cystourethrogram. Diuretics : Water, Diuretics, osmotic diuretics, Artificial kidney, Renal function tests — plasma clearance.

8.Reproductive system

Function of Reproductive system, Puberty

Male reproductive system- Functions of testes, spermatogenesis site.

Androgens — Testosterone and functions.

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

9.Muscle nerve physiology

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.

10.Skin–Functions of skin

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

PRACTICALS – ONLY DEMONSTRATION

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

INTERNAL ASSESSMENT

Theory-average of 2 exams conducted 20

*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.

TYPE OF QUESTION	NUMBER OF QUESTIONS	MARKS	SUB-TOTAL
Short essay type	10 (attempt 8)	8 x 5	40
Short answer type	12 (attempt 10)	10 x 3	30
To the point answer	07 (attempt 5)	5 x 2	10
GRAND TOTAL			80

Distribution of Marks for University Theory and Practical Exam

Theory				Practical			Grand total
Theory	Viva Voce	IA	Sub Total	practical	IA	Sub Total	
80	-	20	100	-			100

REFERENCE BOOKS:

Guyton (Arthur) Text Book of Physiology. Latest Ed. Prism Publishers

Chatterjee (CC) Human Physiology Latest Ed. Vol. 1, Medical Allied Agency

Choudhari (Sujith K) Concise Medical Physiology Latest Ed. New Central Book

Ganong (William F) Review of Medical Physiology. Latest Ed. Appleton

A K Jain MLT VenkateshSudakar

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.,)

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.,

2. Measuring cylinders, Porcelain dish

Tubes – Test tubes, centrifuge tubes, test tube draining rack

Tripod stand, Wire gauze, Bunsen burner.

Cuvettes, significance of cuvettes in colorimeter, cuvettes for visible and UV range,
cuvette holders Racks – Bottle, Test tube, Pipette

Dessicator, Stop watch, rimers, scissors

Dispensers – reagent and sample

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

Maintenance of lab glass ware and apparatus:

Glass and plastic ware in Laboratory

*use of glass: significance of boro silicate glass ; care and cleaning

of glass ware, different cleaning solutions of glass

* care and cleaning of plastic ware, different cleaning solutions

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

Water bath: Use, care and maintenance

Oven &Incubators : Use, care and maintenance.

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

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

Reflux condenser : Use, care and maintenance

Centrifuges (Theory and demonstration) Diagrams to be drawn

Definition, Principle, svedberg unit, centrifugal force, centrifugal field rpm,

rcf. Conversion of G to rpm and vice versa.

Different types of centrifuges

Use care and maintenance of a centrifuge

Laboratory balances [Theory &Practicals) Diagrams to be drawn

Manual balances: Single pan, double pan, trip balance

Direct read out electrical balances.

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

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

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

Principle, Parts Diagram.

Use, care and maintenance.

pH meter (Theory & practicals) Diagrams to be drawn

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

Use, care and maintenance of Ph meter and electrodes

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

4. Safety of measurements

5. Conventional and SI units

6. Atomic structure

Dalton's theory, Properties of electrons, protons, neutrons, and nucleus, Rutherford's model

of atomic structure, Bohr's model of atomic structure, orbit and orbital, Quantum numbers,

Heisenberg's 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 NHCl etc.,

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

Saturated and supersaturated solutions.

Standard solutions. Technique for preparation of standard solutions eg: Glucose, urea, etc.,

Significance of volumetric flask in preparing standard solutions. Volumetric flasks of different sizes, Preparation of standard solutions of deliquescent compounds (CaCl₂, potassium carbonate, sodium hydroxide etc.,)

Preparation of standards using conventional and SI units

Acids, bases, salts and indicators.

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

Estimation of Blood sugar, Blood Urea and electrolytes

Demonstration of Strips

Demonstration of Glucometer

Internal Assessment

Theory - Average of two exams conducted 20

Practicals: Record & Lab work 10

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

Scheme of Examination Theory

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

TYPE OF QUESTION	NUMBER OF QUESTIONS	MARKS	SUB-TOTAL
Short essay type	10 (attempt 8)	8 x 5	40
Short answer type	12 (attempt 10)	10 x 3	30
To the point answer	07 (attempt 5)	5 x 2	10
GRAND TOTAL			80

Distribution of Marks for University Theory and Practical Exam

Theory				Practicals			Grand total
Theory	Viva Voce	IA	Sub Total	Practicals	IA	Sub Total	
80	-	20	100	*			100

Text Book References

- Biochemistry –by U Sathyanarayana& U Chakrapani
- Textbook of Medical Biochemistry by D.M Vasudeva&Shrrekumari.
- Textbook of Medical Biochemistry- by MN Chatterjea&RanaShinde
- Textbook of Medical Laboratory technology by Godkar and Godkar.
- Biochemistry- by PankajaNaik
- Medical Laboratory technology by RamnikSood.

- Manipal Manual of Clinical Biochemistry for medical laboratory and M.Sc., students- by ShivanandaNayak B
- Varley's Practical Clinical Biochemistry,

PATHOLOGY

HistoPathology ,Clinical Pathology, Haematology and Blood Banking

Theory – 70 hours

Practical – 20 hours

THEORY

HistoPathology -

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

Clinical Pathology –

- Introduction to Clinical Pathology
- Collection, Transport, Preservation, and Processing of various clinical specimens
- Urine Examination – Collection and Preservation of urine.

Physical, chemical, Microscopic Examination

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

Haematology –

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

Bleeding Time, Clotting Time, Prothrombin Time, Activated Partial Thromboplastin Time.

Blood Bank

Introduction

Blood grouping and Rh Types

Cross matching

PRACTICALS

- Urine Examination.

- Physical
- Chemical
- Microscopic
- Blood Grouping Rh typing.
- HbEstimation, Packed Cell Volume[PCV], Erythrocyte Sedimentation rate {ESR}
- Bleeding Time, Clotting Time.

INTERNAL ASSESSMENT

Theory-average of 2 exams conducted 20
 Practicals: record and lab work* 10

*There shall be no university practical examination and internal assessment marks secured in Practicals need not be sent to the university.

SCHEME OF EXAMINATION THEORY

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

TYPE OF QUESTION	NUMBER OF QUESTIONS	MARKS	SUB-TOTAL
Short essay type	10 (attempt 8)	8 x 5	40
Short answer type	12 (attempt 10)	10 x 3	30
To the point answer	07 (attempt 5)	5 x 2	10
GRAND TOTAL			80

Distribution of Marks for University Theory and Practical Exam

Theory				Practicals			Grand total
Theory	Viva Voce	IA	Sub Total	Practicals	IA	Sub Total	
80	-	20	100	*			100

REFERENCE BOOKS:

1. Culling Histopathology techniques
2. Bancroft Histopathology techniques
3. Koss- Cytology

4. Winifred Diagnostic cytopathology
5. Orell Cytopathology
6. Todd and Sanford- clinical diagnosis by Laboratory Medicine
7. Dacie and Lewis- Practical Hematology
8. Ramnik SOOD. Lab technology, Methods and interpretation, 4 th edition JP Bros New Delhi,

1996

Microbiology I

Theory: 70 Hours
Practicals: 20 Hours

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

Principles & practice of sterilization methods.

Collection and despatch of specimens for routine microbiological investigations.

Interpretation of commonly done bacteriological and serological investigations.

Control of Hospital infections

Biomedical waste management

Immunization schedule

Theory - 70 hours

1. Morphology 4 hours

Classification of microorganisms, size, shape and structure of bacteria. Use of microscope in the study of bacteria.

2. Growth and nutrition 4 hours

Nutrition, growth and multiplications of bacteria, use of culture media in diagnostic

bacteriology.

3. Sterilisation and Disinfection 4 hours

Principles and use of equipments of sterilization namely Hot Air oven, Autoclave and serum 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 management

Anaerobic culture methods.

INTERNAL ASSESSMENT

Theory-average of 2 exams conducted	20
Practicals: record and lab work*	10

*There shall be no university practical examination and internal assessment marks secured in Practicals need not be sent to the university.

SCHEME OF EXAMINATION THEORY

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

TYPE OF QUESTION	NUMBER OF QUESTIONS	MARKS	SUB-TOTAL
Short essay type	10 (attempt 8)	8 x 5	40
Short answer type	12 (attempt 10)	10 x 3	30
To the point answer	07 (attempt 5)	5 x 2	10
GRAND TOTAL			80

Distribution of Marks for University Theory and Practical Exam

Theory				Practicals			Grand total
Theory	Viva Voce	IA	Sub Total	Practicals	IA	Sub Total	
80	-	20	100	*			100

Reference Books-

1. Ananthanarayana&Panikar Medical Microbiology- University Press
2. Robert Cruickshank- Medical Microbiology- The Practice of Medical Microbiology
3. Chatterjee- Parasitology- Interpretation to Clinical Medicine
4. Rippon- Medical Mycology
5. Emmons- Medical Mycology
6. Basic Laboratory methods in Parasitology, J P Bros, New Delhi
7. Basic Laboratory procedures in clinical bacteriology, J P Bros, New Delhi
8. Medical Parasitology- AjitDamle
9. Introduction to medical microbiology- Ananthanarayana- Orient Longman Pvt. Ltd

SUBSIDIARY SUBJECTS

ENGLISH

COURSE OUTLINE

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

BEHAVIOURAL OBJECTIVES:

The student at the end of training is able to

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

UNIT - I: INTRODUCTION:

Study Techniques

Organisation of effective note taking and logical processes of analysis and synthesis

Use of the dictionary

Enlargement of vocabulary

Effective diction

UNIT - II: APPLIED GRAMMAR:

Correct usage

The structure of sentences

The structure of paragraphs

Enlargements of Vocabulary

UNIT - III: WRITTEN COMPOSITION:

Precise writing and summarizing

Writing of bibliography

Enlargement of Vocabulary

UNIT - IV: READING AND COMPREHENSION:

Review of selected materials and express oneself in one's words.

Enlargement of Vocabulary.

UNIT - V: THE STUDY OF THE VARIOUS FORMS OF COMPOSITION:

Paragraph, Essay, Letter, Summary, Practice in writing

UNIT - VI: VERBAL COMMUNICATION:

Discussions and summarization, Debates, Oral reports, use in teaching

SCHEME OF EXAMINATION

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.

BIO STATISTICS

Theory: 70 Hours

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 Binomial distribution.

The normal distribution.

Divergence from normality - skewness, kurtosis.

Unit -VI: Sampling Techniques

Need for sampling - Criteria for good samples. Application of sampling in Community.

Procedures of sampling and sampling design 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 ratios of health.

REFERENCE

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.

Methods of Giving Nourishment: Feeding, Tube feeding, drips, transfusion

Care of Rubber Goods

Recording of body temperature, respiration and pulse,

Simple aseptic technique, sterilization and disinfection.

Surgical Dressing: Observation of dressing procedures

First Aid :

Syllabus as for Certificate Course of Red Cross Society of St. John's Ambulance Brigade.

Reference Books:

Preventive and Social Medicine by J.Park

Text Book of P & SM by Park and Park

Counseling & Communicate skills for medical and health, Bayne- Orient Longman Pvt. Ltd.

Scheme of Examination

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%

SECOND YEAR B.Sc.NEUROSCIENCE TECHNOLOGY

Applied Anatomy & Physiology Related to Neuroscience

Course Objective

This course will provide an outline of anatomy and physiology to improve the students understanding of the technical and diagnostic procedures used with special emphasis on applied aspects.

Unit I

Neuro Anatomy

Cranial vault

Base of skull and relations

The meninges

Cerebral hemispheres – Frontal, parietal, temporal and occipital lobes

Basal ganglia & diencephalons

Midbrain

Brain Stem

Pons

Medulla oblongata

Cerebellum

The ventricular system & cisterns

Arterial supply (major vessels)

Veins and venous sinuses

The cranial nerves 1 to 12

Surface anatomy of cranial nerves

The spinal cord

The bony canal and ligaments and meninges and their extent; organization of structures in the cord at various levels

Arterial supply and Venous drainage

Spinal segments and spinal Nerve

Unit- II

Neurophysiology

Physiology of vision – optic pathway

Physiology of hearing – auditory pathway

Motor control – pyramidal system

Extra pyramidal system

Cerebellum

Physiology of the ANS – divisions, chemical

Transmission functions & higher centers for regulation

The autonomic nervous system

Sympathetic nervous system

Parasympathetic nervous system

Formation

Neuro transmitters

The skeletal muscles Myotomes & their innervations Dermatomes & their innervation

Membrane potentials

Action potential

Synaptic transmission – excitation, inhibition

The physiology of Neuro-muscular transmission – the n-m junction

Types of somatic sensations & sensory pathways

Physiology of muscle – mechanisms of contraction & relaxation

The motor unit – its composition & function

Practicals: Includes the abovementioned theory units

Recommended Books

Clinical Neuroanatomy – Richard.S.Snell

Reference Books

1.Manual of Practical Anatomy - Cunningham's (G.J. Romones)

2. Textbook of Anatomy with colour atlas - Inderbir Singh

3. Textbook of Medical Physiology – Guyton & Hall

SCHEME OF EXAMINATION

TYPE OF QUESTION	NUMBER 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 PRACTICALS

Basic Electroencephalography

Theory 70 hours

Practical 30 hours

Course Objective

This course will cover basic instrumentation parameters, fundamentals of EEG, appropriate electrode placement using the International 10-20 System of head measurement, machine operation and instrumentation, EEG pattern recognition, Interpret record, morphology and various abnormal EEG.

Unit – I

Basics of Instrumentation

Electrical concepts

Conduction, insulation

Voltage current, resistance, power

Capacitance, inductance

DC/AC

Impedance

Transistors

Differential power amplifier

Unit – II

The Electroencephalography & Instrumentation

Filter-High frequency

Low frequency

Time constant Biological filters

50Hz filters

Sensitivity

Calibration

Paper speed

Pen mechanism

Digital Signal process

Gain

Sweep

Stimulator

Jackbox

Common mode rejection

Block Diagram of EEG

Activational Procedures

-Photic Stimulation

-Hyper ventilation

Signal to noise ratio

Sampling rate

Unit – III

Electroencephalography recording technique

Electrodes-Types, Materials, Maintenance of electrode

Modes of application

The 10-20 system

The 10-10 system

Special electrodes in EEG

Reporting

Montages-Bipolar/Referential/Monopolar/laplacian

Video of EEG

Ambulatory EEG

Unit – IV

Normal rhythms & Abnormal

(A) Normal rhythms: alpha, beta, gamma, delta, theta, Mu, Lambda, Conewaves

(B) Abnormal waveforms: Spike, Sharp, Polyspike, spike and slow waves, PLEDS, Slow waves, FIRDA, Phantom Spike and wave, Photoparoxysmal response, triphasic sharp waves

Epilepsy

- Abnormal epileptic patterns
 - (a) Benign rolandic epileptic forms
 - (b) 3/sec cycle
 - (c) CJD
 - (d) PLED's
 - (e) Subacute sclerotic lateralized epileptic discharges
 - (f) Hypsarhythmia/ west syndrome

Unit – V

Artifacts

Non- Physiological Artifact

Physiological Artifact

Unit – VI

Patients grounding & safety

- Analog and digital EEG
- Factors affecting EEG
- Drugs affecting EEG
- EEG changes in sleep
- EEG in comatose patient
- Electrical silence

Unit – VII

Disease Condition Related

- Mechanism
- Clinical features
- Diagnosis
- Treatment
- Alzheimer
- Dementia
- Parkinson's disease
- Parkinson's Plus
- Parkinsonism
- DBS
- Stroke – Thrombotic, Embolic, Aneurysm, TIA
- Epilepsy
- Management of Seizure

Unit – VIII

- Neuro transmitters in CNS

Practicals: Includes the abovementioned theory units

Recommended Books

1. EEG in Clinical in Practice – John R. Hughes
2. Electroencephalography – Ernst Niedermeyer, Fernando Lopes da Silva

Reference Books

1. Primer of EEG: With A Mini-Atlas, 1e - A. James Rowan MD and Eugene Tolunsky MD

SCHEME OF EXAMINATION

TYPEOFQUESTION	NUMBEROF QUESTIONS	MARKS	SUB-TOTAL
LONG ESSAY (LE)	3(Toattempt2)	2 X 10	20
SHORT ESSAY (SE)	8(Toattempt6)	6 X 5	30
SHORT ANSWER (SA)	12(Toattempt10)	10 X 3	30
TOTAL MARKS			80

PRACTICALS:

Practical exam: 80 marks

One common practical for all the two papers with equal weightage of marks i.e.40 practical marks for each paper.

Basic Nerve Conduction Studies (NCS)

Theory 70 hours

Practical 30hours

Course Objective

This course will cover basic instrumentation parameters, fundamentals of NCS, appropriate electrode stimulation and recording parameters, machine operation and instrumentation, waveform pattern recognition, basic troubleshooting skills, relate skills for performing basic and uncommon NCS procedures and identify potential disease or injury processes correlates with NCS results.

Unit – I

Basics of Nerve conduction studies

Nerve conduction velocity

Action potential

CMAP & SNAP

Depolarization, Repolarization, Hyperpolarization

Ions exchange

Stimulation parameters

Recording Techniques

Resting membrane potential

End plate potential

Miniature end plate potential

Threshold

Unit – II

Motor & Sensory Nerve conduction

- **Median Nerve:**
 - Anatomy
 - Techniques
 - Values
 - Clinical conditions (CTS, median nerve neuropathy, median nerve palsy)
 - Test (physical examination, tinel's test, Phalen's, Maneuver test)
- **Ulnar Nerve:**

-Clinical conditions (cubital tunnel syndrome, ulnar nerve palsy, ulnar neuropathy, claw hand)

-Test (physical examination, Watson test, Shear test, Piano key sign, Lichtman test)

- **RadialNerve:**

-Clinical conditions (Radial tunnel syndrome, Saturday night palsy, radial neuropathy)

-Test (physical examination, NCS)

- **PeronealNerve:**

-Clinical conditions (fool drop, peroneal nerve palsy, common peroneal nerve dysfunction peroneal neuropathy)

-Test (physical examination, NCS, common peroneal nerve stress)

- **TibialNerve:**

-Clinical conditions (tarsal tunnel syndrome, tibial neuropathy)

-Test (tarsal tunnel syndrome test, NCS)

- **Superficial Peroneal Nerve:**

-Clinical conditions (Superficial Peroneal Nerve entrapment)

-Test (NCS, physical examination)

- **SuralNerve:**

-Clinical conditions (mononeuropathy)

-Test (NCS, physical examination)

- **Facial Nerve:**

-Clinical conditions (Bell's palsy, facial palsy, Bell's Phenomenon, ptosis)

-Test (FNC, blink reflex)

- **Trigeminal Nerve:**

-Clinical conditions (Trigeminal Neuralgia)

-Test (pm or cotton swap test)

- **Brachial Plexus**

Introduction

Schematic Diagram

Median

Ulnar

Radial

Axillary

Musculocutaneous

Clinical conditions (Brachial plexus injuries – stingers, by birth, inflammation or tumor and accidents)

Test (EMG, NCS, MRI, CT)

Unit – III

Late Responses

F-waves

H-reflex

Axonal

Unit – IV

Nerve conduction study changes in damaged Nerve conditions

Traumatic

Demyelinating

AxonalMotor neuron disease

Neuropraxia

Wallerian degeneration

Axonal temesis

Neurotemesis

Computer application in Nerve conduction studies

Practicals: Includes the above mentioned theory units

- Electrodes Identification
 - Electrode Application
 - Care of Electrodes
 - Calculation of Nerve Conduction Parameters
- Interpretation of basic Nerve Conductions studies

Recommended Books

1. Laboratory Reference for Clinical Neurophysiology – Jay.A.Liveson
Dong.M.Ma
2. Electrodiagnostic Medicine – Daniel Dumitru

Reference Books

1. Electrodiagnosis in Diseases of Nerve and Muscle: Principles and Practice by Jun Kimura
2. Aminoff's Electrodiagnosis in Clinical Neurology – Micheal J. Aminoff

SCHEME OF EXAMINATION

TYPE OF QUESTION	NUMBER 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

PRACTICAL:

Practical exam: 80 marks

One common practical for all the two papers with equal weightage of marks i.e. 40 practical marks for each paper.

PHARMACOLOGY

Theory 50 hours

COURSE OBJECTIVE:

To introduce the student a significance of medicine related to general pharmacology.

COURSE CONTENT:

2. Introduction to Pharmacology
3. Pharmacokinetics
4. Pharmacodynamics
5. Adverse effects of drugs
6. Classification of drugs
7. 6.1. Autonomic nervous system
 - ✓ Introduction. Neurotransmitters, their mechanism of action
 - ✓ Drugs affecting-
 - Pupillary size and light reflex
 - Intraocular tension
 - Accommodation
 - ✓ Skeletal muscle relaxants
7. .1. Cardiovascular system
 - ✓ Antihypertensives and drugs useful in angina
- 8.1. Diuretics
 - ✓ IN ocular disorders
- 9.1. Central nervous system
 - ✓ Alcohol, sedative hypnotics, general & local anesthetics, opioids & non-opioids
- 10.1. Chemotherapy
 - ✓ Introduction, general chemotherapy
 - ✓ Specific chemotherapy – antifungal, Antiviral, Antitubercular, Antileprotic
- 10.1.Hormones
 - ✓ Corticosteroids
 - ✓ Anitidiabetics
- 11.1.Blood
12. Coagulants
13. Antibiotics
14. Anti inflammatory
15. Analgesic and antipyretic
16. Muscle relaxant etc.
17. Classification, effects, mechanism of action, indication and contra indication.

PHARMACOLOGY RELATED TO NEUROSCIENCE TECHNOLOGY

Course Objective

This course will cover general pharmacology with special emphasis on common drugs, routes of administration, types of formulations, dose and frequency of administration, side effects and toxicity, management to toxic effects, drugs interactions, knowledge of chemical and trade names, importance of manufacturing and expiry dates and instructions about handling drugs.

Unit – I

Epilepsy

Neurotransmitters, Therapeutics, Antiepileptic drugs, dosage & side effects (toxicity), Phenytoin (eptoïn, dilantin 100) also parenteral, Phenobarbitone (Gardenal 30, 60 also parenteral.), Carbamezapine (tegretol, zeptol, mazetol, Zen 100, 200, 400), Carbamazepine – controlled release (or), Valproate sodium (valparin, epile x 200, syrup), Ethosuximide (zarontin), Primidone, Colonzepam (rivotril, lanazep 0.5,2)

New drugs

Gabapentin (neuortin 300, 400, 600), Vigabatrin, Lamotrigne, Drugs used in emergency: - diazepam (IV), IM, Lorazepam (IV, IM), Phenytoin (IV), Phenobarbitone (IV), Lignocaine (IV), Valproate (IV), Pentothal Sodium (IV), Pharmacology of neuromuscular transmission

Unit – II

Neurotransmitters

Receptors, Types, Mechanisms

Drugs used - Neostigmine, Pyridostigmine, Edrophonium, guanidine

Unit – III

Cerebral Vascular Accident

Drugs used, Antiplatelet agents, Aspirin, ticlopidine, anti Coagulants, Heparin, Warfarin, anti hypertensives, Oral hypoglycemics (anti diabetic), Anti edema agents (Diuretics) Mannito, Steroids, Frusemide (lasix), Thazides.

Unit – IV

Extrapyramidal disease

Drugs used - Levodopa, Pimozide, Haloperidol,

Unit – V

Infections – Antibiotics, Anti parasitic, Anti viral, Anti fungal agents, Anti mycobacterial,

Miscellaneous – Steroids, Anti inflammatory agents, Pain Mechanism, Analgesics. Other psychotropic, Drugs

Recommended Books

1. Essentials of Medical Pharmacology - Triparthi
2. Medical Pharmacology for Allied Health Sciences – Padmaja Udayakumar

TYPE OF QUESTION	NUMBER 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

SUBSIDIARY SUBJECTS

CLINICAL PSYCHOLOGY

THEORY HOURS: 20

1. Introduction to psychology
2. Intelligence, Learning, Memory, Personality, Motivation
3. Body integrity- one's body image
4. Patient in his milieu
5. Self concept of the therapist, Therapist patient relationship-some guidelines
6. Illness and its impact on the patients
7. Maladies of the age and their impact on the patient's own and others concept of his body image
8. Adapting changes in vision
9. Why Medical Psychology needs / demands commitment?

THIRD YEAR B.Sc NEUROSCIENCE TECHNOLOGY

Advanced Neuroscience technique 1

Theory 70 hours

Practical 30hours

Course Objective

This course will cover basic instrumentation parameters, fundamentals of EP's, appropriate electrode placement stimulation and recording parameters, machine operation and instrumentation, waveform pattern recognition, basic troubleshooting skills, relate skills for performing basic and uncommon EP's procedures and identify potential disease or injury processes correlates with Ep's results.

Unit – I

Evoked Potentials - Basics of Instrumentation

Evoked potentials-definition

Principles of averaging/recording techniques

Evoked potential Instrumentation

- General
- Analogue
- Digital

Signal to noise ratio

Frequency response

Internal noise

Unit – II

B.A.E.R

Introduction

Auditory pathway

Patient preparation

Materials required

Procedure

Factors affecting

Normal values and waveforms

Limitations

Clinical conditions – MS, CP angle, tumor

BAER in Pediatrics

Unit – III

V.E.P

Introduction

Visual pathway

Types of VEP

Patient preparation

Materials required

Procedures

Factors affecting

Limitations

Normal values

Clinical conditions

Pediatric VEP

Responses and values

Unit – IV

SSEP

Introduction

Patient preparation

Technique

Types

Upper limbs - Median SSEP
Lower limbs – Tibial Motor SSEP
Special techniques – MEPs
SSEP in brainstem/spinal cord/
Anatomical and physiological basis of SEP
Reproducibility of SEP
Patient related factors of SEP
Clinical applications of SEP
Multiple Sclerosis
Metabolic disorders
Plenopathy
Spinal cord trauma
Cervical Spondylosis and myelopathy
Surgical monitoring of SSEP

Unit – V

MEP

Measurements of CMCT and PMCT in MEP(Peripheral and central motor conduction time)
Tract – CT
Abnormalities in CMCT
Clinical conditions in MEP
MS
Motor neuron disease
Movement disorders
Peripheral nerve disorders
Lumbar spinal stenosis and radiculopathies
Miscellaneous disorders
Psychogenic weakness

Myelopathy

Cerebral infarction

Patient preparation

Procedure

Limitations

Unit – VI

BLINK REFLEX

Unit – VII

Neuropathies

AIDP

GBS

CIDP

Peripheral Neuropathy

Diabetic neuropathy

Subacute idiopathic

Demyelinating polyradiculoneuropathy

Multifocal motor neuropathy

Focal Neuropathy

Neuropathies associated with AIDS

(a) Mononeuropathy

(b) Progressive Polyradiculoneuropathy

(c) Autonomic neuropathy

Unit – VIII

Radiculopathy

L₅ – S₁ radiculopathy

Cervical

Cervical spondylosis

S₁ – S₂

Conduction block

Temporal dispersion

Unit – IX

Special technique

Median

ulnar

radial

parasympathetic response

Unit – X

Lumbar plexus

Lumbosacral plexopathy

Femoral

Saphenous

Obturator

L.F.C.N

Meralgia parasthesia

Sacral Plexus

Sciatic

Common Peroneal

Deep Peroneal

Superficial Peroneal

Sural NCS

Tibial

Tarsal tunnel syndrome

Posteriorcutaneous nerve of thigh

Unit – XI

Spinal cord compression

Lumbar disc prolapsed

Spinal cord injury

Unit – XII

Non limb nerves

Computer application in evoked potentials

Practicals: Includes the abovementioned theory units

Recommended Books

1. Laboratory Reference for Clinical Neurophysiology – Jay.A.Liveson
Dong.M.Ma
2. Electrodiagnostic Medicine – Daniel Dumitru

Reference Books

1. Electrodiagnosis in Diseases of Nerve and Muscle: Principles and Practice by Jun Kimura
2. Aminoff's Electrodiagnosis in Clinical Neurology – Micheal J. Aminoff

SCHEME OF EXAMINATION

TYPE OF QUESTION	NUMBER 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

PRACTICAL EXAMINATION: One common practical for all the two papers with equal weightage of marks i.e. 40 practical marks for each paper.

ADVANCED TECHNIQUE - II

Course Objective

This course will cover basic instrumentation parameters, fundamentals of EMG & Autonomic Function Studies, recording parameters, machine operation and instrumentation, Correctly identify and grade needle EMG findings, waveform pattern recognition, basic troubleshooting skills, safety considerations related to EMG testing.

Electromyography & Special studies

Unit – I

Disease Related

Autosomal dominant disease

Disorders of body schema

Antons syndrome

Spacial disorder

Various disorders of speech and language

Verbal fluency aphasia

Ataxia

Apraxia

Nominal aphasia

Broca aphasia

Dysarthria

Unit – II

PSG

Introduction

Normal adult PSG

Stages of sleep

Waveform

- K complex
- POST
- Sleep sprindles
- VST
- BETS

Clinical condition

- Apnea
 - (a) Central
 - (b) OSA
 - (c) Mixed
- Hypopnea
- Parasomnias
- Narcolepsy
- REM sleep disorder
- Arousal seizures
- RLS
- PLM's
- RERA
- AHI
- CPAP
- BiPAP

Unit – III

Paediatric PSG

Introduction

Disease

- Apnea
- Obstructive hypoventilation
- Gastroesophageal reflux
- Nocturnal Seizures
- PLMD (Pediatric Limb Movement Disorder)
- SIDS

Sleep center environment

Recording parameter

Capinography

- End tidal
- Transcutaneous

Audio and video recording

Paediatric montages

Biocalibrations

Unit – IV

EMG

Basics

Recording techniques

Muscles and localization

Insertional activity

Spontaneous activity

Motor units

Polyphasic

SFEMG

Jitter and blocking

SEMG

QEMG

Fasciculations

Fibrillations

Macro EMG

Types of needles

Unit – V

Normal and abnormal patterns

Endplate potential

MUP

Localization technique

Neurogenic patterns

Myopathic patterns

Clinical conditions

ALS

Myopathy

Myotonia

Dystonia

Muscular dystrophies

DMD

Polymyocitis

Anterior poliomyelitis

Willson disease

Deep tendon reflex

Unit – VI

Patient safety in EMG

Computer application in EMG

Unit – VII

Autonomic Function Studies

Sympathetic skin response

R-R interval

Practicals: Includes the abovementioned theory units

Recommended Books

1. Electrodiagnosis An Anatomical & Clinical Approach – Chu-Andrews, Robert J, Johnson
2. Laboratory Reference for Clinical Neurophysiology – Jay.A.Liveson Dong.M.Ma

Reference Books

1. Electrodiagnosis in Diseases of Nerve and Muscle: Principles and Practice by Jun Kimura
2. Clinical Electromyography – Shin J. OH

SCHEME OF EXAMINATION

TYPE OF QUESTION	NUMBER 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

PRACTICAL EXAMINATION:

One common practical for all the two papers with equal weightage of marks i.e. 40 practical marks for each paper.

SYSTEMIC DISEASES

CONCEPTS OF DISEASE AND OUTLINES OF CLINICAL EVALUATION RELATED TO NEUROSCIENCE TECHNOLOGY

Theory 50 hours

Course Objective

This course will cover common diseases and their causes, pertinent microbiology and pathology of the system involved, outline of major signs and symptoms and management of the disease including medical and surgical intervention.

The basic neurological examination with emphasis on

Unit – I

- ❖ CVA Cause, Types, syndromes, treatment
 - Ischaemic diseases
 - Thrombotic
 - Embolitic
- ❖ Trauma Head injury
 - Spinal
 - Peripheral
 - Vascular diseases
- ❖ Hemorrhagic
- ❖ Intra cerebral hemorrhage
- ❖ Sub arachnoid hemorrhage
- ❖ Haematoma
- ❖ Hemiplegia
- ❖ Hemiparesis
- ❖ Quadriplegia
- ❖ Paraplegia
- ❖ Extradural haematoma
- ❖ Damage of Lobes
- ❖ Effects of cerebella lesion
- ❖ Bed sores

Unit – II

- ❖ Infectious diseases
 - Bacterial
 - Mycobacterial
 - Viral
 - Fungal
 - Spirochetal
 - Rickettsial
 - Viral encephalitis
 - Tuberculosis meningitis
 - Japanese encephalitis

- ❖ Demyelinating disease
 - CIDP
 - Central Multiple sclerosis
 - Peripheral other Demyelinating neuropathies

Unit – III

- ❖ Somatic disorders
 - Pain
 - Headache
 - Backache
 - Craniofacial pains
 - Cervical spondylosis
 - Thoracic out let syndrome

Unit – IV

- ❖ Disorders of speech & Language
 - Aphasia & its types
 - Articulation & phonation

- Disease of cranial nerves
 - V & VII nerve

Unit – V

- ❖ Inherited metabolic disease
 - Autosomal disease
 - Mitochondrial disease
- ❖ Disturbances of cerebrospinal fluid - Hydrocephalus

Unit – VI

- ❖ Sleep & its abnormalities
 - Physiology
 - Sleep disorders
- ❖ Developmental disease of nervous system
 - Microcephaly, Macrocephaly

Unit – VII

Epilepsies

Classification & clinical approach

Epileptic syndrome

Treatment

Unit – VIII

Disorders of PNS & Neuromuscular transmission

Neuropathies/entrapment and infective neuropathies-Leprosy, Rabies

Myasthenia gravis

Myasthenic syndrome

Botulism

Unit – IX

Disorder of muscle

Twitches & pain & cramps

Inflammatory myopathies

Muscular dystrophies – Classification

Metabolic & toxic myopathies

Congenital muscular disorders

Myotonia

Unit – X

Degenerative disorders & Classification

Alzheimers

Dementia

Chorea

Extrapyramidal disorders

Parkinsonism

Unit – XI

Disorders of Autonomic Nervous system

Physiology

Regulation of BP

Unit – XII

Disorders of equilibrium

Vertigo

Toxic and metabolic disorders

Deficiency disorders

Migraine

Giddiness

Syncope

Loss of Consciousness

Practicals: Includes the abovementioned theory units

Recommended Books

1. Principles of Neurology – Victor Adams
2. Neurology and Neurosurgery Illustrated - Kenneth W. Lindsay

Reference Books

Neurology in Clinical Practice Principles of Management and Diagnosis – Bradley Daroff
Fenichel Jankovic

SCHEME OF EXAMINATION

TYPE OF QUESTION	NUMBER OF QUESTIONS	MARKS	SUB-TOTAL
LONG ESSAY (LE)	3 (To attempt 2)	2 X 10	20
SHORT ESSAY (SE)	12 (To attempt 10)	10 X 5	50
SHORT ANSWER (SA)	12 (To attempt 10)	10 X 3	30
TOTAL MARKS			100

NO PRACTICAL EXAMINATION

SUBSIDIARY SUBJECTS

RESEARCH METHODOLOGY & STATISTICS

THEORY HOURS: 60

1. Introduction I: Biostatistics

Definition

Role of statistics in health science and health care delivery system

2. Introduction II: Research Methodology

Research process

Steps involved in research process

Research methods and methodology

3. Variables and scales of measurements

Definitions and examples of qualitative, quantitative, continuous discrete, dependent and independent variables.

Definitions, properties and examples of nominal, ordinal, interval and ratio scales of measurements

4. Sampling

- ✓ Population, sample, sampling, reasons for sampling, probability and non-probability sampling.
- ✓ Methods of probability sampling – simple random, stratified, systematic- procedure
- ✓ Merits and demerits.
- ✓ Use of random number table.

5.OrganizatiOn of data

Frequency table, histogram, frequency polygon, frequency curve, bar diagram, pie chart

6.Measures of locatiOn

- ✓ Arithmetic mean, median, mode, quartiles and percentiles – definition

Computation (for raw data), merits, demerits and applications

7.Measures of variatiOn

- ✓ Range, inter-quartile range, variance, standard deviation, coefficient of variation- definition

Computation (for raw data), merits, demerits and applications

8.Normal distributiOn

- ✓ Concept, graphical form, properties, examples

Concept of Skewness and Kurtosis

9.CorrelatiOn

- ✓ Scatter diagram

concept and properties of correlation coefficient, examples [No computation]

10. Health InformatiOn System

- ✓ Definition, requirement, component and uses of health information system.

Sources of health information system- Census, Registration of vital events, Sample registration system (SRS), Notification of diseases, Hospital records, Disease registries, Record linkage, Epidemiological surveillance, Population survey

11.Vital statistics and hospital statistics

Rate, ratio, proportion, Incidence, Prevalence. Common morbidity, mortality and Fertility statistics – Definition and computation.

12.Hypothesis

- ✓ What is hypothesis
- ✓ Formulation of hypothesis

Characteristics of good hypothesis.

13.Epidemiology

- ✓ Concept of health and disease

- ✓ Definition and aims of Epidemiology,

Descriptive Epidemiology- methods and uses.

14. Concept of reliability & validity

RECOMMENDED BOOKS

1. Methods in Biostatistics for medical students & Research workers Mahajan B.K.- 6th edition
2. Research methodology – Methods & techniques Kothari.C.R
3. Introduction to Biostatistics: A manual for students in health sciences Sundar Rao PSS, Richard.J
4. Text book of Preventive and social medicine Park.E.Park