

**Revised Ordinance Governing Regulations and
Curriculum**

of

B.Sc.NEUROSCIENCETECHNOLOGY

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

4 ನೇ 'ಟಿ' ಬ್ಲಾಕ್, ಜಯನಗರ, ಬೆಂಗಳೂರು - 560 041

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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,

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 theory 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 40Hours

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:

Research & Biostatistics

20Hours

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

05 papers in the 1st year
03 papers in the 2nd Year
03 papers in the 3rd Year.

Practical examination:

Three practical examinations, at the end 2nd Year, three practical examinations at the end of the 3rd year and 1 practical exam at the end of 4th 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	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	3 Hours	100	20	120
	Subsidiary Subject**				
1	English	3 Hours	100	20	120
2	Kannada	3 Hours	100	20	120
3	Health Care	3 Hours	100	20	120

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)	100	20	120	80 (40+40)	20 (10+10)	100	340
II	Basic Nerve Conduction Study (NCS)	100	20	120				
III	Applied Anatomy & Physiology Related to Neuroscience	100	20	120	No Practical	--	--	120
IV	Pharmacology	100	20	120	No Practical	--	--	120

**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	Theory		Practical					Grand Total
	Subject	Univ. exam	IA	Sub Total	Univ. Prac	IA	Sub Total	
I	Advanced Technique 1	100	20	120	80 (40 + 40)	20 (10+10)	100	340
II	Advanced Technique 2	100	20	120				
III	Systemic Diseases	100	20	120	No practical			120

**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 subject shall be 35% of the maximum marks prescribed for a subject. The marks obtained in the subsidiary subjects shall be communicated to the University before the Commencement of the University examination.

10.2. Second and Third year Examination

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

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

11. Carry over benefit

11.1 First year examination:

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

11.2. Second year examination:

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

12. Declaration of Class

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

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

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

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

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

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

13. Eligibility for the award of Degree:

A candidate shall have passed in all the subjects of first, second and third year to be eligible for a compulsory 12 months of rotational internship. and completed one year of internship with pass criteria in outgoing clinical assessment exams.

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

SUBJECTS HAVING MAXIMUM MARKS= 100 (for First year)		
Type of Questions	No. of Questions	Marks for Each Questions
Long Essay	2	10
Short Essay	10	05
Short Answer	10	03

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**

SUBJECTS HAVING MAXIMUM MARKS 80 marks (subsidiary subjects)		
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= 100 (for Second and Third Year)		
Type of Questions	No. of Questions	Marks for Each Questions
Long Essay	2	10
Short Essay	10	05
Short Answer	10	03

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 (No choice) 10x3= 30 marks
- Total= 100**

SUBJECTS HAVING MAXIMUM MARKS= 50		
Type of Questions	No. of Questions	Marks for Each Questions
Long Essay	2	10
Short Essay	10	05
Short Answer	10	03

- | | |
|--|------------------|
| 1. Long essay- 1 Questions (No choice) | 1x10= 10 marks |
| 2. Short essay- 05 Questions (Choice is in Question no 3) | 05x5= 25 marks |
| 3. Short answer- 10 Questions (Choice is in Question no 3) | 05x3= 15 marks |
| | Total= 50 |

INTERNSHIP

12 months compulsory rotational postings during which students have to work under the supervision of experienced staff.

1 practical university examination towards the end of internship

FIRST YEAR B.Sc. NEUROSCIENCE TECHNOLOGY

ANATOMY

Theory: 70hrs

Practical's: 20hrs

Chapter 1

Introduction:

Theory:

- Definition of anatomy and its divisions
- Terms of location, positions and planes
- Epithelium-definition, classification, describe with examples, function
- Glands- classification, describe serous, mucous & mixed glands with examples
- Basic tissues – classification with examples

Practical:

- Histology of types of epithelium
- Histology of serous, mucous & mixed salivary gland

Chapter 2

Connective tissue:

Theory:

- Cartilage – types with example & histology theory
- 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
- Histology of compact bone (TS & LS)

- Histology of skeletal (TS & LS) & cardiac muscle
- Demo of all bones showing parts, radiographs of normal bones & joints
- Demonstration of important muscles of the body

3. Cardiovascular system:

Theory:

- Heart-size, location, chambers, exterior & interior, pericardium
- 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
- Inferior vena cava, 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 & vein, medium sized artery & vein
- Histology of lymph node, spleen, tonsil & thymus
- Radiology: Normal chest radiograph showing heart shadows

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, spleen, peritoneum & reflections

Practical:

- Demonstration of parts of GIT
- Radiographs of abdomen

5. Respiratory system

- Parts of RS: nose, nasal cavity, larynx, trachea, lungs, bronchopulmonary segments, diaphragm
- Histology of trachea, lung and pleura
- Names of paranasal air sinuses

Practical:

- Demonstration of parts of respiratory system.
- Normal radiographs of chest, X-ray paranasal sinuses
- Histology of lung and trachea

6. Urinary system**Theory:**

- 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

7. 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

8. Endocrine glands**Theory:**

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

Practical:

- Demonstration of the glands
- Histology of pituitary, thyroid, parathyroid, suprarenal glands

9. 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

10. 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

11. 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 100 marks. Distribution of type of questions and marks for Anatomy shall be as given under.

SUBJECTS HAVING MAXIMUM MARKS= 100 (for First year)		
Type of Questions	No. of Questions	Marks for Each Questions
Long Essay	2	10
Short Essay	10	05
Short Answer	10	03

- | | |
|---|-------------------|
| 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 |

Distribution of Marks for University Theory and Practical Exam

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

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. Lippin Cott. Philadelphia

6. Bhatnagar- Essentials of Human Embryology- Revised Edition. Orient Blackswan Pvt. Ltd.

PHYSIOLOGY

Theory 70 hours

Practical 20hours

1. General Physiology

Introduction to cell physiology, transport across cell membrane

Homeostasis, Body Fluid compartment & measurement

2. Blood

Introduction - composition and function of blood

Plasma. proteins, types and functions

Red blood cells - erythropoiesis, stages of differentiation, factors affecting it, function, normal count, physiological variation.

Hemoglobin- function, concentration, types & methods of Hb estimation, fate of hemoglobin
Jaundice-types Anaemia,-types

ESR, PCV, osmotic fragility & blood indices

WBC- morphology, production, functions, normal count, differential count, variation, variation Immunity (in brief)

Platelets- origin, morphology, normal count, function-Platelet plug ,bleeding disorder

Haemostasis - definition, normal haemostasis, clotting factors, mechanism of clotting, anticoagulants disorders of clotting factors.

Blood group-ABO & Rh system, Rh incompatibility blood typing ,cross matching, hazards of mismatched blood transfusion

RES, spleen and lymph

3. Nerve-Muscle

Neuron structure, types, neuroglia-types, nerve fibre classification, properties of nerve fibres, RMP,action potential, wallerian degeneration

NMJ, blockers, Myasthenia gravis

Classification of muscle, structure of skeletal muscle, sarcomere, contractile proteins

Excitation contraction coupling, mechanism of muscle contraction, types of contraction

Motor unit, fatigue, rigor mortis Smooth muscle

4. Respiratory system

Physiological anatomy of respiratory system, muscles of respiration, respiratory & non respiratory functions of lungs, dead space

Mechanics of breathing, intrapulmonary & pleural pressures

Compliance, Surfactant, Hyaline membrane disease

Lung volumes and capacities

Respiratory membrane , transport of O₂ & CO₂

Chemical regulation of respiration
Neural regulation of respiration
Hypoxia, Acclimatization,
Dysbarism. Artificial respiration
Definition-Periodic breathing ,dyspnoea, apnoea, asphyxia,, cyanosis

5. Cardiovascular system

Introduction to CVS & general principles of circulation
Properties of Cardiac muscle
Cardiac cycle, heart sounds, Pulse
Cardiac output, factors and measurement
Heart rate
BP-factors, measurement, Short term regulation
Intermediate and long term regulation of BP
ECG uses and significance, .normal waveform, heart block
Coronary circulation, Cutaneous circulation-Triple response
Shock
Effects of exercise on CVS and Respiratory system

6. Renal system, Skin and body temperature

Kidneys- functions, structure of nephron, type, juxtaglomerular apparatus-structure and function, non-excretory functions of kidney
Glomerular filtration rate (GFR)- Definition ,normal value, factors affecting GFR
Tubular reabsorption - sites, substance reabsorbed, mechanisms of reabsorption
Tubular secretion- sites, substance secreted, mechanisms of reabsorption
Counter current mechanism of concentration of urine
Obligatory and Facultative reabsorption of water
Micturition reflex, Diuretics
Artificial kidney, renal function tests-clearance tests
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

7. Digestive system

Physiological anatomy, Enteric nervous system & functions of GIT
Saliva- composition, regulation, disorder.
Deglutition- stages & disorders
Stomach-functions, composition and regulation of gastric juice
Gastric motility, MMC, vomiting reflex.
Pancreas- function, composition and regulation of pancreatic juice
Liver & gall bladder-functions, bile- composition, secretion and regulation
Small intestine- Succus entericus-composition, functions & movements
Large intestine- functions, movements and defecation reflex
Digestion & absorption of Carbohydrates, fats and proteins

8. Endocrine system

Classification of Endocrine glands & their hormones & properties-chemistry and receptor, feedback mechanisms of hormone regulation.

Anterior pituitary hormones- secretion, functions , disorders

Posterior pituitary hormones- secretion , functions , disorders

Thyroid hormones- secretion, functions, disorders

Parathyroid hormones- secretion, functions, disorders

Calcium homeostasis & disorders

Pancreatic hormones, -Insulin and Glucagon- . secretion, functions, disorders

Adrenal cortex- Glucocorticoids & Mineralocorticoids, Androgen - secretion, functions, disorders

Adrenal medulla- secretion, functions, disorders Thymus & Pineal gland

9. Reproductive system

Introduction to reproductive system, sex differentiation & Puberty

Male reproductive system, functions of testosterone & Spermatogenesis

Female reproductive system, fuctions of Estrogen, Progesterone, Oogenesis

Ovulation & Menstrual cycle

Physiological changes during pregnancy, pregnancy tests, parturition & lactation

Male & Female contraceptive methods

10. Central nervous system

Introduction to CNS, Sensory receptors classification, properties

Synapse– classification, properties

Sensory pathways: Anterior spino thalamic tract and Posterior column pathway

Lateral spino thalamic tract, Types of pain, Referred pain, Thalamus; nuclei and function

Classification of reflexes, Monosynaptic reflex- Stretch reflex , muscle spindle ,inverse stretch reflex. Polysynaptic reflex-Withdrawal reflex

Motor pathways : Pyramidal pathway and functions, UMNL, LMNL

Cerebral cortex (Sensory and motor)-functions, Medulla and Pons-functions

Cerebellum –functions, disorders

Basal ganglia-functions, disorders

Hypothalamus and Limbic system-functions

CSF, lumbar puncture

Sleep, EEG,

Autonomic Nervous System - Sympathetic and parasympathetic distribution and functions

11. Special senses

Vision –Functional anatomy of eye, visual pathway, lesion

Refractive errors, color vision

Audition – Physiological anatomy of ear, Mechanism of hearing, auditory pathway, deafness

Olfaction –modalities, receptor, function, abnormalities

Gustation-modalities, receptor, function, taste pathway, abnormalities .Practicals

Blood pressure Recording
 Auscultation for Heart Sounds
 Artificial Respiration
 Determination of vital capacity

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 100 marks. Distribution of type of questions and marks for Physiology shall be as given under.

SUBJECTS HAVING MAXIMUM MARKS= 100 (for First year)		
Type of Questions	No. of Questions	Marks for Each Questions
Long Essay	2	10
Short Essay	10	05
Short Answer	10	03

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**

Distribution of Marks for University Theory and Practical Exam

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

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

BIOCHEMISTRY

No. Theory classes: 70 hours

No. Practical classes: 20 hours

1. Carbohydrate Chemistry [3 hours]

- Classification (Definition/ examples for each class)
- Monosaccharides (classification depending upon number of carbon atoms and functional group with examples)
- Disaccharides (Sucrose/ lactose/ maltose and their composition)
- Polysaccharides :
 - a) Homopolysaccharides (Structure of starch and glycogen)
 - b) Heteropolysaccharides (Functions)

2. Lipid Chemistry [3 hours]

- Definition of lipids
- Functions of lipids in the body
- Classification of lipids (subclasses with examples)
- Definition and Classification of fatty acids
- Essential fatty acids
- Phospholipids and their importance

3. Amino-acid and Protein Chemistry [3 hours]

- General structure of D and L amino acids
- Amino acids; Definition and Classification of amino acids with examples.
- Peptides; definition & Biologically important peptides
- Classification of Proteins based on composition, functions and shape (with examples)
- Functions of amino acids and Proteins

4. Nucleotide and Nucleic acid Chemistry [3 hours]

- Nucleosides & Nucleotides
- Nucleic acid Definition & types
- Composition & functions of DNA & RNA
- Structure of DNA (Watson and Crick model)
- Structure of tRNA, & functions of tRNA, rRNA, mRNA

- Difference between DNA and RNA

5. Enzymes [5 hours]

- Definition & Classification of Enzymes with example
- Definitions of Active site, Cofactor (Coenzyme, Activator),
- Proenzyme; Definition and examples (Pepsin & trypsin)

6. Digestion and Absorption [3 Hours]

- General characteristics of digestion and absorption,
- Digestion and absorption of carbohydrates, proteins and lipids.

7. Carbohydrate Metabolism [5 Hours]

- Glycolysis ; Aerobic, Anaerobic, Definition , Site and subcellular site , Steps with all the enzymes and coenzymes at each step , mention the regulatory enzymes , Energetics,
- Citric acid cycle; Pyruvate dehydrogenase complex (reaction and coenzymes) , Site and subcellular site , Reactions with all the enzymes and coenzymes ,Regulatory enzymes , Energetics
- Significance of HMP Shunt pathway.
- Hyperglycemic and hypoglycemic hormones
- Blood Glucose Regulation.
- Diabetes mellitus (definition, classification, signs and symptoms)
- **Glycogen metabolism and gluconeogenesis**

8. Lipid Metabolism [4 Hours]

- Introduction to lipid metabolism, Lipolysis
- Beta oxidation of fatty acids ; Definition ,Site and subcellular site , Activation of palmitic acid , Transport of activated palmitic acid into mitochondria , Reactions , Energetics.
- Name the different ketone bodies . Note on ketosis

9. Amino acid and Protein Metabolism [3 Hours]

- Introduction, transamination, deamination, Fate of ammonia, transport of ammonia,
- Urea cycle.

10. Vitamins [5 Hours]

- Definition and classification.
- RDA, sources, coenzyme forms, biochemical functions and disorders for the following water soluble vitamins: Thiamine, Niacin, Pyridoxine, Cobalamin, Folic acid, Ascorbic acid
- RDA, sources, coenzyme forms, biochemical functions and deficiency disorders for the following fat soluble vitamins; A and vitamin D

11. Mineral Metabolism [3 Hours]

- Name the macro/ microminerals
- Iron: Sources ,RDA, Functions and Disorders of deficiency and excess
- Calcium and phosphorus: Sources ,RDA, functions, normal serum levels and hormones regulating their levels

12. Nutrition [6 hours]

- Balanced diet (Definition)
- Caloric value ; Definition , Caloric values of carbohydrates, proteins and fats
- Total daily caloric requirements of an adult male and female,
- RDA (Definition, standard values for nutrients)
- Basal metabolic rate(BMR) ; Definition , Magnitude of BMR in men and women, Factors affecting BMR
- Thermic effect/ SDA of food (Definition, values for major macronutrients)
- Carbohydrates ;. Daily dietary requirement. 2. Dietary fibers (Definition, functions, importance and their daily requirements)
- Proteins ;. Daily requirement, Biological value. a. Definition b. Protein used as a standard for this, Protein sources with high and low biological value , Mutual supplementation of proteins (Definition, examples).
- Fats ; Daily requirement , Essential fatty acids (Definition, functions, daily requirement and deficiency manifestations) , Saturated and unsaturated fatty acids (Definition, sources, examples).
- Malnutrition

13. Renal Function Tests [2 hours]

- Name the different tests to assess the kidney functions
- Explain Creatinine clearance & Inulin clearance
- Urinary acidification test

14. Radioactive Isotopes [1 hour]

- Definition, clinical applications
- Biological effects of radiations

15. Clinical Biochemistry [5 hours]

A. Definitions of acid, base, pH and pKa [1 hour]

B. Buffers • Definition [2 hours]

- Henderson Hasselbalch equation,
- Principal buffer systems in the ECF ICF and urine
- Bicarbonate and phosphate buffer systems (pKa value, normal ratio of base/acid in the plasma)
- Acidosis & Alkalosis (Definition, classification, causes and biochemical findings)

C. Normal serum levels and condition where they are altered [2 hour]

- Glucose, Protein, urea, uric acid, and creatinine
- Bilirubin, cholesterol
- Serum Electrolytes

16. Fundamental Chemistry (1 hour)

- Valency, Molecular weight & Equivalent weight of elements and compounds. Normality, Molarity, Molality.

17. Solutions: Definition, use, classification where appropriate, preparation and storage (5 hours)

- Stock and working solutions.
- Molar and Normal solutions of compounds and acids. (NaCl, NaOH, HCl, H₂SO₄, H₃PO₄, CH₃COOH etc.,)
- Preparation of percent solutions – w/w, v/v w/v (solids, liquids and acids), Conversion of a percent solution into a molar solution
- Saturated and supersaturated solutions

- Standard solutions. Technique for preparation of standard solutions and Storage. E.g: glucose, albumin etc.
- Dilutions- Diluting Normal , Molar and percent solutions. Preparing working standard from stock standard.
- Part dilutions: Specimen dilutions. Serial dilutions. Reagent dilution. Dilution factors

ASSIGNMENT TOPICS

1. Units of measurement
2. Hazards - Physical, Chemical, Biological
3. Arterial blood gas analysis
4. Responsibilities of Health care personnel
5. Biomedical waste management

PRACTICAL DEMONSTRATION

- Color Reactions of Carbohydrates & amino acids.
- Precipitation Reactions of proteins
- Colorimetry
- Estimation of Blood glucose Folin Wu and enzymatic method
- Estimation of Urea by DAM method

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 100 marks. Distribution of type of questions and marks for Biochemistry I shall be as given under.

SUBJECTS HAVING MAXIMUM MARKS= 100 (for First year)		
Type of Questions	No. of Questions	Marks for Each Questions
Long Essay	2	10
Short Essay	10	05
Short Answer	10	03

- | | |
|---|-------------------|
| 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 |

Distribution of Marks for University Theory and Practical Exam

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

Text Book References

- Biochemistry – 3rd revised edition by U Sathyanarayana & U Chakrapani
- Textbook of Medical Biochemistry-6th Edition by MN Chatterjea & Rana Shinde
- Textbook of Medical Laboratory technology 2nd edition by Godkar and Godkar.
- Biochemistry-3rd edition by Pankaja Naik
- Medical Laboratory technology 6th edition by Ramnik Sood.
- Manipal Manual of Clinical Biochemistry for medical laboratory and M.Sc., students- 3rd edition by Shivananda Nayak B
- Varley's Practical Clinical Biochemistry, 4th, 5th and 6th editions

PATHOLOGY

Clinical Pathology, Hematology and Blood Banking

Theory-70 hours

Practicals-20 hours

I. Clinical Pathology- Theory

- Introduction to clinical pathology
- Collection , transport, preservation and processing of various clinical specimens
- Urine examination- collection and preservation, Physical, chemical and microscopic examination for abnormal constituents
- Examination of Body fluids
- Examination of Cerebrospinal fluid (CSF)
- Sputum examination
- Examination of feces

II. Hematology – Theory

- Introduction to hematology
- Normal constituents of Blood, their structure and functions
- Collection of Blood samples
- Various anticoagulants used in Hematology
- Hemoglobin estimation, different methods and normal values
- Packed cell volume
- Erythrocyte sedimentation rate
- Normal Haemostasis
- Bleeding time. Clotting time, prothrombin time, Activated partial Thromboplastin time

III. Blood Bank- Theory

- Introduction blood banking
- Blood group system
- Collection and processing of blood for transfusion
- Compatibility testing
- Blood transfusion reactions
- **General Pathology:**
- **Cell injury:**
 - a. Definition, causes.
 - b. Cellular adaptations – Hypertrophy, hyperplasia, atrophy and metaplasia.
 - c. Types of cell injury – Reversible and irreversible; morphology of reversible injury.
 - d. Necrosis – Definition and patterns of tissue necrosis.
 - e. Intracellular accumulations – Lipids, cholesterol, proteins, glycogen and pigments; examples.
 - f. Pathologic calcification – Types and examples.
- **3) Inflammation:**
 - a. Definition and signs of inflammation.

- b. Types – Acute and chronic inflammation.
 - c. Acute inflammation – Causes, morphological patterns and outcome.
 - d. Chronic inflammation – Causes, morphology and examples.
 - e. Regeneration and repair – Mechanism of cutaneous wound healing.
 - f. Factors affecting wound healing.
- **4) Hemodynamic disorders:**
 - a. Edema – Definition, pathogenesis and types: Renal, cardiac, pulmonary and cerebral.
 - b. Difference between transudate and exudate.
 - c. Shock – Definition, types of shock with examples: Hypovolemic, cardiogenic and septic shock, stages of shock: Nonprogressive, progressive and irreversible.
 - d. Thrombosis – Definition, mechanism of thrombus formation (Virchow's triad) and fate of thrombus.
 - e. Embolism – Definition and types: Thromboembolism, fat, air and amniotic fluid embolism.
 - f. Infarction – Definition and examples.
- **5) Immune system:**
 - a. Autoimmune diseases – General features, enumerate systemic and organ specific autoimmune diseases.
 - b. Systemic lupus erythematosus – Manifestations and diagnosis.
- **6) Neoplasia:**
 - a. Definition and nomenclature of tumors.
 - b. Differences between benign and malignant neoplasms.

- c. Enumerate modes of carcinogenesis: Genes, physical, chemical and microbial agents of carcinogenesis.
- d. Modes of spread of tumors.
- e. Clinical aspects of neoplasia.
- f. Grading and staging of cancers.
- g. Laboratory diagnosis of cancer.

Practicals

1. Urine analysis- Physical, Chemical, Microscopic
2. Blood grouping and Rh typing
3. Hb estimation , packed cell volume (PCV), Erythrocyte Sedimentation rate (ESR)
4. Bleeding time and 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 100 marks. Distribution of type of questions and marks for Pathology I shall be as given under.

SUBJECTS HAVING MAXIMUM MARKS= 100 (for First year)		
Type of Questions	No. of Questions	Marks for Each Questions
Long Essay	2	10
Short Essay	10	05
Short Answer	10	03

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**

Distribution of Marks for University Theory and Practical Exam

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

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
9. Sathish Gupta , Short text book of Medical laboratory techniques for technicians
10. Sachdev K N. Clinical Pathology and Bacteriology, 8th edi JP Bros, New Delhi, 1996

Microbiology I

Theory: 70 Hours

Practicals: 20 Hours

1. Introduction (6 hrs)

History of Microbiology - Louis Pasteur, Antony Van Leeuwenhoek, Robert Koch, Edward Jenner, Alexander Fleming.

Use of microscope in the study of bacteria - Types of microscopes - compound

microscope, phase contrast microscope, electron microscope, fluorescent microscope, dark ground microscope.

Morphology of bacterial cell

2. Growth and Nutrition (6 hrs.)

Nutrition, growth and multiplication of bacteria, bacterial growth curve, culture media, culture methods, anaerobic culture methods.

3. Sterilization and disinfection (8 hrs.)

Principles and use of equipments of sterilization, chemicals used in disinfection, testing of disinfectants.

4. Biomedical waste management principle and practice

5. Immunology (5hrs.)

Immunity - mechanism of immunity, classification, types

Vaccines

Immunization schedule

Definition of antigen, antibody, list of antigen antibody reaction (no need of detailed account of antigen antibody reactions)

Definition of hypersensitivity and classification (no need of detailed account of types of hypersensitivity)

6. Infection (5 hrs.)

Definition, types and mode of transmission

Hospital acquired infection - causative agents, mode of transmission and prophylaxis.

Antimicrobial sensitivity testing

7. Systematic bacteriology (15 hrs.)

Disease caused and laboratory diagnosis of medically important bacteria (Staphylococcus, coagulase negative Staphylococcus, MRSA, Streptococcus pyogenes, Pneumococcus, gonococcus, E.coli, diarrhoeagenic E.coli, Salmonella, Vibrio cholerae, ElTor vibrios, Halophilic vibrios, Shigella, Mycobacterium tuberculosis, Mycobacterium leprae, Atypical Mycobacteria, Treponema pallidum, leptospira)

(no need of classification, antigenic structure, virulence mechanism)

8. Parasitology (10 hrs.)

Introduction to Parasitology

List of medically important parasites and diseases (E.histolytica, Plasmodium, W.bancrofti, Ascaris, Ancylostoma, B.coli, G.lambliia, T.solium, T.saginata)

Laboratory diagnosis of parasitic infection

(No need of including life cycles)

9. Virology (10 hrs.)

Introduction to virology

List of medically important viruses and diseases (AIDS, Hepatitis, Rabies, Polio, Arbo viruses)

Cultivation of viruses and laboratory diagnosis of viral infections

10. Mycology (5 hrs.)

Introduction to Mycology

Classification of medically important fungi - (based on morphology, spore production, disease production, taxonomy)

List of medically important fungi and diseases (Candidiasis, Cryptococcosis, Dermatophytes, Aspergillosis, Mucor Mycosis)

Laboratory diagnosis of fungal infections.

Practicals (20 hrs.)

Compound microscope (Demonstration)

Demonstration of sterilization equipments

Demonstration of culture media and culture methods

Demonstration of antibiotic sensitivity testing

Demonstration of serological tests - Widal, VDRL, ASO, CRP, RA

Demonstration of gram stain and ZN staining

Demonstration of Helminthic ova

Grams stain, Acid fast staining

Stool exam for Helminthic ova

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 Practical 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 I shall be as given under.

SUBJECTS HAVING MAXIMUM MARKS= 100 (for First year)		
Type of Questions	No. of Questions	Marks for Each Questions
Long Essay	2	10
Short Essay	10	05
Short Answer	10	03

- | | |
|---|-------------------|
| 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 |

Distribution of Marks for University Theory and Practical Exam

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

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- Ajit Damle
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.

SUBJECTS HAVING MAXIMUM MARKS= 80 (for First year)		
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

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, 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:

1. Preventive and Social Medicine by J.Park
2. Text Book of P & SM by Park and Park
3. 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

SUBJECTS HAVING MAXIMUM MARKS= 80 (for First year)		
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

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

SUBJECTS HAVING MAXIMUM MARKS= 100		
Type of Questions	No. of Questions	Marks for Each Questions
Long Essay	2	10
Short Essay	10	05
Short Answer	10	03

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 (No choice) 10x3= 30 marks
- Total= 100**

NO PRACTICALS

Basic Electroencephalography

Theory 70 hours

Practical 30hours

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) Seizure , Epilepsy and the classification of epilepsy

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

(C) 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) Hypsarrhythmia/ 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
- Stroke – Thrombotic, Embolic, Aneurysm, TIA
- Epilepsy
- Management of Seizure
- Glasscow coma scale
- Hydrocephalus
- EEG findings in brain death

Unit – VIII

- Neuro transmitters in CNS
- Intraoperative EEG monitoring during epilepsy surgery

Practicals: Includes the above mentioned 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

SUBJECTS HAVING MAXIMUM MARKS= 100		
Type of Questions	No. of Questions	Marks for Each Questions
Long Essay	2	10
Short Essay	10	05
Short Answer	10	03

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 (No choice) 10x3= 30 marks
- Total= 100**

PRACTICALS:

Practical exam: 80 marks

One common practical for all the 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)
- **UlnarNerve:**
 - 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 (foot 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

Axonal Motor neuron disease Neuropraxia

Wallerian degeneration Axonal demyelination Neurotmesis

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 Conduction 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

SUBJECTS HAVING MAXIMUM MARKS= 100		
Type of Questions	No. of Questions	Marks for Each Questions
Long Essay	2	10
Short Essay	10	05
Short Answer	10	03

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 (No choice) 10x3= 30 marks
- Total= 100**

PRACTICAL:

Practical exam: 80 marks

One common practical for all the 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 (eptoin, dilantin 100) also parenteral, Phenobarbitone (Gardenal 30, 60 also parenteral.), Carbamezapine (tegretole, zeptol, mazelol, 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, Lamotrigine, 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, Pacitane, 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

SUBJECTS HAVING MAXIMUM MARKS= 100 (for Second and Third Year)		
Type of Questions	No. of Questions	Marks for Each Questions
Long Essay	2	10
Short Essay	10	05
Short Answer	10	03

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 (No choice) 10x3= 30 marks
- Total= 100**

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 Milan
5. Selfconcept of the therapist, Therapistpatient relationship-some guidelines
6. Illness and it's 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 sterosis 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

SUBJECTS HAVING MAXIMUM MARKS= 100		
Type of Questions	No. of Questions	Marks for Each Questions
Long Essay	2	10
Short Essay	10	05
Short Answer	10	03

- | | |
|--|-------------------|
| 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 (No choice) | 10x3= 30 marks |
| | Total= 100 |

PRACTICAL EXAMINATION: One common practical for all the 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

Therapeutic AIDS for few
neurological disorder

VNS

TMS

ECT

FES

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

SUBJECTS HAVING MAXIMUM MARKS= 100 (for Second and Third Year)		
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- Total= 100**

PRACTICAL EXAMINATION:

One common practical for all the 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
 - Embolic
- ❖ 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

SUBJECTS HAVING MAXIMUM MARKS= 100 (for Second and Third Year)		
Type of Questions	No. of Questions	Marks for Each Questions
Long Essay	2	10
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Short Answer	10	03

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 (No choice)	10x3= 30 marks
	Total= 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