Revised Ordinance Governing Regulations and Curriculum

of

B.Sc. NEUROSCIENCE TECHNOLOGY

COURSE - 2019
Rajiv Gandhi University of Health Sciences,
Karnataka, Bangalore
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.
NOTIFICATION


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.
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 1st, 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**

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Subject</th>
<th>Theory No. of Hours</th>
<th>Practical No. of Hours</th>
<th>Total No. of Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Human Anatomy</td>
<td>70</td>
<td>20</td>
<td>90</td>
</tr>
<tr>
<td>2</td>
<td>Physiology</td>
<td>70</td>
<td>20</td>
<td>90</td>
</tr>
<tr>
<td>3</td>
<td>Biochemistry I</td>
<td>70</td>
<td>20</td>
<td>90</td>
</tr>
<tr>
<td>4</td>
<td>Pathology I (Clinical Pathology, Haematology &amp; Blood Banking)</td>
<td>70</td>
<td>20</td>
<td>90</td>
</tr>
<tr>
<td>5</td>
<td>Microbiology</td>
<td>70</td>
<td>20</td>
<td>90</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>350</td>
<td>100</td>
<td>450</td>
</tr>
</tbody>
</table>

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

**Subsidiary Subjects**

- English 25 Hours
- Kannada 25 Hours
- Health-Care 40 Hours

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**

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Subject</th>
<th>Theory No. of Hours</th>
<th>Practical No. of Hours</th>
<th>Clinical Postings</th>
<th>Total No. of Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Basic Electroencephalography</td>
<td>70</td>
<td>30 (15+15)</td>
<td>--</td>
<td>100</td>
</tr>
<tr>
<td>2</td>
<td>Basics of Nerve Conduction Study (NCS)</td>
<td>70</td>
<td>30 (15+15)</td>
<td>-</td>
<td>100</td>
</tr>
<tr>
<td>3</td>
<td>Applied Anatomy &amp; Physiology Related to Neuroscience Technology</td>
<td>70</td>
<td>30 (15+15)</td>
<td>-</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>Pharmacology related to Neuroscience technology</td>
<td>50</td>
<td>-</td>
<td>--</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>260</strong></td>
<td><strong>90</strong></td>
<td></td>
<td><strong>350</strong></td>
</tr>
</tbody>
</table>

**Subsidiary Subjects:**

Medical Psychology 20 Hours

Table - III Distribution of Teaching Hours in Third Year Subjects

**Main Subjects**

<table>
<thead>
<tr>
<th>Sl. no</th>
<th>Subjects</th>
<th>Theory No. of Hours</th>
<th>Practical No. of Hours</th>
<th>Clinical Posting</th>
<th>Total No. of Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Advanced Technique I</td>
<td>70</td>
<td>30</td>
<td>310</td>
<td>410</td>
</tr>
<tr>
<td>2</td>
<td>Advanced Technique II</td>
<td>70</td>
<td>30</td>
<td>310</td>
<td>410</td>
</tr>
<tr>
<td>3</td>
<td>Systemic Disease</td>
<td>50</td>
<td>-</td>
<td></td>
<td>50</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>190</strong></td>
<td><strong>60</strong></td>
<td><strong>620</strong></td>
<td><strong>870</strong></td>
</tr>
</tbody>
</table>

**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**

<table>
<thead>
<tr>
<th>A</th>
<th>Main Subjects*</th>
<th>Written Paper</th>
<th>I A Theory</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Duration</td>
<td>Marks</td>
<td>Marks</td>
<td>Marks</td>
</tr>
<tr>
<td>1</td>
<td>Basic Anatomy (Including Histology)</td>
<td>3 Hours</td>
<td>80</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>Physiology</td>
<td>3 Hours</td>
<td>80</td>
<td>20</td>
</tr>
<tr>
<td>3</td>
<td>Biochemistry</td>
<td>3 Hours</td>
<td>80</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>Pathology</td>
<td>3 Hours</td>
<td>80</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>Microbiology</td>
<td>3 Hours</td>
<td>80</td>
<td>20</td>
</tr>
</tbody>
</table>

**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

<table>
<thead>
<tr>
<th>Paper</th>
<th>Subject</th>
<th>Theory</th>
<th></th>
<th>Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Univ. exa</td>
<td>IA</td>
<td>Sub Total</td>
</tr>
<tr>
<td>I</td>
<td>Basic Electroencephalography (EEG)</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>II</td>
<td>Basic Nerve Conduction Study (NCS)</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>III</td>
<td>Applied Anatomy &amp; Physiology Related to Neuroscience</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td>IV</td>
<td>Pharmacology</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
</tbody>
</table>

**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

<table>
<thead>
<tr>
<th>B</th>
<th>Subsidiary Subject**</th>
<th>Duration</th>
<th>Marks</th>
<th>I A Theory Marks</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Medical Psychology</td>
<td>3 Hours</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
</tbody>
</table>

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

### TABLE – VI

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

<table>
<thead>
<tr>
<th>Paper</th>
<th>Subject</th>
<th>Theory</th>
<th>Practical</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Univ. exam</td>
<td>IA</td>
</tr>
<tr>
<td>I</td>
<td>Advanced Technique 1</td>
<td>80</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>Advanced Technique 2</td>
<td>80</td>
<td>20</td>
</tr>
<tr>
<td>III</td>
<td>Systemic Diseases</td>
<td>80</td>
<td>20</td>
</tr>
</tbody>
</table>

No practical
Distribution of Subsidiary Subjects and marks for Third Year Examination of

B.Sc. NEUROSCIENCE TECHNOLOGY

<table>
<thead>
<tr>
<th>B</th>
<th>Subsidiary Subject**</th>
<th>Duration</th>
<th>Marks</th>
<th>I A Theory Marks</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Research &amp; Biostatistics</td>
<td>3 Hours</td>
<td>80</td>
<td>20</td>
<td>100</td>
</tr>
</tbody>
</table>

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

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 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**

<table>
<thead>
<tr>
<th>SUBJECTS HAVING MAXIMUM MARKS= 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Questions</td>
</tr>
<tr>
<td>Essay Type</td>
</tr>
<tr>
<td>Short Essay Type</td>
</tr>
<tr>
<td>Short Answer Type</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SUBJECTS HAVING MAXIMUM MARKS= 80 (for first year B.Sc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Questions</td>
</tr>
<tr>
<td>Short Essay Type</td>
</tr>
<tr>
<td>Short Answer Type</td>
</tr>
<tr>
<td>To The Point Answer</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SUBJECTS HAVING MAXIMUM MARKS= 80 (for second and third year B.Sc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Questions</td>
</tr>
<tr>
<td>Essay Type</td>
</tr>
<tr>
<td>Short Essay Type</td>
</tr>
<tr>
<td>Short Answer Type</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SUBJECTS HAVING MAXIMUM MARKS= 60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Questions</td>
</tr>
<tr>
<td>Essay Type</td>
</tr>
<tr>
<td>Short Essay Type</td>
</tr>
<tr>
<td>Short Answer Type</td>
</tr>
<tr>
<td>Type of Questions</td>
</tr>
<tr>
<td>-------------------------</td>
</tr>
<tr>
<td>Essay Type</td>
</tr>
<tr>
<td>Short Essay Type</td>
</tr>
<tr>
<td>Short Answer Type</td>
</tr>
</tbody>
</table>

**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 glad – (gross & histology)
Practical: Demonstration of the glands
Histology of pituitary, thyroid, parathyroid, suprarenal glands

10. Nervous system
Theory: Neuron
Classification of NS
Cerebrum, cerebellum, midbrain, pons, medulla oblongata, spinal cord with spinal nerve
(gross& histology)
Meninges, Ventricles & cerebrospinal fluid
Names of basal nuclei
Blood supply of brain
Cranial nerves
Sympathetic trunk & names of parasympathetic ganglia
Practical: Histology of peripheral nerve & optic nerve
Demonstration of all plexuses and nerves in the body
Demonstration of all part of brain
Histology of cerebrum, cerebellum, spinal cord

Sensory organs:
Theory:
Skin: Skin-histology
Appendages of skin
Eye: Parts of eye & lacrimal apparatus
Extra-ocular muscles & nerve supply
Ear: parts of ear- external, middle and inner ear and contents
Practical: Histology of thin and thick skin
Demonstration and histology of eyeball
Histology of cornea & retina

Embryology:
Theory:
Spermatogenesis & oogenesis
Ovulation, fertilization
Fetal circulation
Placenta

INTERNAL ASSESSMENT
Theory-average of 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.

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Distribution of Marks for University Theory and Practical Exam

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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
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 Paced 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.


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.


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.


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 — Comparison, Juxta Glomerular Apparatus — Structure and function.


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


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**


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. Haemogiobinometry
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
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 Physiology shall be as given under.

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**REFERENCE BOOKS:**

BIOCHEMISTRY

No. Theory classes: 70 hours

No. of practical classes: 20 hours

Theory:

Specimen collection: Pre-analytical variables

Collection of blood

Collection of CSF & other fluids

Urine collection

Use of preservatives

Anticoagulants

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 etc.,)

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 maintanance
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 uncertainly 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 H 2S04 etc.,

Preparation of normal solutions eg., IN Na2CO3, O IN Oxalic acid, 0.1 N HCl, 0.1N H2504, 0.66 N H2S04 etc.,
Percent solutions. Preparation of different solutions – v/v w/v (solids, liquids and acids)

Conversion of a percent solution into a molar solution

**Dilutions**

Diluting solutions: eg. Preparation of 0.1 N NaCl from 1 N NaCl from 2 NHCl etc.,

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

**Saturated and supersaturated solutions.**

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

Significance of volumetric flask in 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. Arreheenius concept of acids and bases, Lowery – Bronsted theory of acids and bases classification of acids and bases. Different between bases and alkali, acidity and basicity, monoprotonic andpolyprotonic 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 if 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.

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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
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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 inspissrator. Pasteurization, Anti septic and disinfectants.

Antimicrobial sensitivity test

4. Immunology 6 hours

Immunity Vaccines, Types of Vaccine and immunization schedule

Principles and interpretation of commonly done serological tests namely Widal, VDRL, ASLO, CRP, RF & ELISA. Rapid tests for HIV and HbsAg(Technical details to be avoided)

5. Systematic Bacteriology 20 hours

Morphology, cultivation, diseases caused ,laboratory diagnosis including specimen collection of the following bacteria( the classification, antigenic structure and pathogenicity are not to be taught)

Staphyloccci, Streptococci, Pneumococci, Gonococci, Menigococci, C diphtheriae, Mycobacteria, Clostridia, Bacillus, Shigella, Salmonella, Esch coli, Klebsiella, Proteus, vibrio cholerae, Pseudomonas & Spirochetes

6. Parasitology 10 hours

Morphology, life cycle, laboratory diagnosis of following parasites

E. histolytica, Plasmodium, Tape worms, Intestinal nematodes

7. Mycology 4 hours

Morphology, diseases caused and lab diagnosis of following fungi.

Candida, Cryptococcus, Dermatophytes ,opportunistic fungi.

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

9. Hospital infection Causative agents, transmission methods, investigation, prevention and control Hospital infection. 4 hours

10. Principles and practice Biomedical waste management 4 hours

PRACTICAL 20 HOURS

Compound Microscope.

Demonstration and sterilization of equipments – Hot Air oven, Autoclave, Bacterial filters.

Demonstration of commonly used culture media, Nutrient broth, Nutrient agar, Blood agar,

Cholate 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

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2. Robert Cruckshank- Medical Microbiology- The Practice of Medical Microbiology
3. Chatterjee- Parasitology- Interpretation to Clinical Medicine
4. Rippon- Medical Mycology
5. Emmons- Medical Mycology
6. Basic Laboratory methods in Parasitology, 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**
2. Wren and Martin - Grammar and Composition, 1989, Chanda& Co, Delhi
5. Journalism Made Simple D Wainwright
6. Writers Basic Bookself Series, Writers Digest series
7. Interviewing by Joan Clayton Platkon
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 so.

Unit-V: Probability and Standard Distributions.
Meaning of probability of standard distribution. The Binominal distribution.
The normal distribution.
Divergence from normality - skewness, kurtosis.

Unit - VI: Sampling Techniques
Need for sampling - Criteria for good samples. Application of sampling in Community.
Procedures of sampling and sampling designs, errors. Sampling variation and tests of significance.

Unit - VII : Health Indicator
Importance of health indicator.
Indicators of population, morbidity, mortality, health services. Calculation of rates and rations of health.

REFERENCE

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 meanings

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 meanings 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**

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**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 patience
- 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

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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 30 hours

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)

- **Radial Nerve:**
  - Clinical conditions (Radial tunnel syndrome, Saturday night palsy, radial neuropathy)
  - Test (physical examination, NCS)

- **Peroneal Nerve:**
  - Clinical conditions (fool drop, peroneal nerve palsy, common peroneal nerve dysfunction peroneal neuropathy)
  - Test (physical examination, NCS, common peroneal nerve stress)

- **Tibial Nerve:**
  - 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)

- **Sural Nerve:**
  - 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 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 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

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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. 6.1. 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
   ✓ Antidiabetics
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.
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), Phenytin (eptoin, 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, Colonzevam (rivotril, lanazep 0.5, 2)

New drugs

Gabapentin (neuortin 300, 400, 600), Vigabatrin, Lamotrigne, Drugs used in emergency: - diazepam (IV), IM, Lorazepam (IV, IM), Phenytin (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

Extraphyramindal 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

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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. Self concept of the therapist, Therapist patient 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 30 hours

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 Epp’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 sternosis 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) Mononenropathy
(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
Posterior cutaneous 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**


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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

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

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

Unit – III

- Somatic disorders
  - Pain
  - Headache
  - Backache
  - Craniofacial pains
  - Cervical spondylosis
  - Thoracic outlet 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

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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 Skewnes 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


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

2. Research methodology – Methods & techniques Kothari.C.R