REGULATIONS & CURRICULUM OF GRADUATE PARAMEDICAL COURSE

BACHELOR OF SCIENCE IN

OPERATION THEATRE AND ANAESTHESIA TECHNOLOGY

2020

Sri Siddhartha Academy of Higher Education Deemed-to-be-University

Established under Section 3 of the UGC Act, 1956
MHRD, GOI No. F.9-31/2006-U.3 (A) Dtd. 30th May 2008

Agalakote, B.H. Road, Tumkur – 572107, Karnataka, India

SRI SIDDHARTHA ACADEMY OF HIGHER EDUCATION

(DEEMED TO BE UNIVERSITY)

Declared under Section 3 of the UGC Act, 1956, MHRD GOI No. F.9-31/2006-U.3 (A) Dated: 30/05/2008

Accredited 'A' Grade by NAAC

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No. SSAHE/ACA-S&C(AHSP)/12/2022 Date: 01/09/2022

NOTIFICATION

Sub: Ordinance pertaining to Regulations and Curriculum of Bachelor of Science in Operation Theatre and Anaesthesia Technology.

Ref: 1). Proceedings of BOS Allied Health Sciences Programmes held on 06/04/2021
2). Proceedings of the Academic Council meeting held on 19/08/2021
3). Proceedings of the Board of Management held on 29/08/2022

In exercise of the powers vested under section 6 of 6.4 of MoA / Rules of SSAHE, the Ordinance pertaining to Regulations and Curriculum of Bachelor of Science in Operation Theatre and Anaesthesia Technology is notified herewith as per Annexure.

The above Regulations shall be applicable to the students admitted to the said course from the academic year 2020-21 onwards.

By Order,

REGISTRAR

REGISTRAR
Sri Siddhartha Academy of Higher Education
TUMKUR - 572 107, Karnataka.

To,
Dean / Principal, Sri Siddhartha Medical College & Hospital,

Copy to
1) Office of the Chancellor, SSAHE, for kind information,
2) PA to Vice-Chancellor / PA to Registrar / Controller of Examinations / Finance Officer, SSAHE
3) The Director (AHSP), SSAHE
4) All Officers of the Academy Examination Branch / Academic Section
5) Guard File / Office copy.

ORDINANCE GOVERNING REGULATIONS & CURRICULUM OF B.Sc. ANAESTHESIA AND OPERATION THEATRE TECHNOLOGY COURSE - 2020

1. Eligibility for admission:

A candidate seeking admission to the B.Sc. Anaesthesia and Operation Theatre 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 Sri Siddhartha Academy of Higher Education with, Physics, Chemistry and Biology as subjects of study.

OR

2. Pre-Degree course from a recognized University considered as equivalent by SSAHE, (Two years after ten years of schooling) with Physics, Chemistry and Biology as subjects of study.

OR

3. Any equivalent examination recognized by the Sri Siddhartha Academy of Higher Education, Tumkur 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 Anaesthesia Technology or Operation Theatre technology 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 Anaesthesia Technology or Operation Theatre technology should have studied Physics, Biology and Chemistry as subjects during the tenure of the course.

6. Lateral entry to second year of B.Sc. Anaesthesia and Operation Theatre Technology for candidates who have passed diploma program from the Government Boards and recognized by SSAHE, fulfilling the conditions specified above under Sl. No. 5.

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 the above course.

2. Duration of the course:
Duration shall be for a period of four years including one year of Internship.

3. Medium of instruction:
The medium of instruction and examination shall be in English.

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

5. Attendance

Every candidate should have attended at least 80% of the total number of classes conducted in an academic year from the date of commencement of the term to the last working day as notified by university in each of the subjects prescribed for that year separately in theory and practical. Only such candidates are eligible to appear for the university examinations in their first attempt. 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 Anaesthesia and Operation Theatre Technology

Theory - 20 marks
2nd & 3rd year B.Sc Anaesthesia and Operation Theatre Technology

Theory – 20 Marks

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

There shall be a minimum of two periodical tests preferably one in each term in theory

and practical of each subject in an academic year. The average marks of the two tests will be calculated and reduced to 20 marks in case of theory and 10 marks in case of practicals. The marks of IA shall be communicated to the University at least 15 days before the commencement of the University examination. The University shall have access to the records of such periodical tests.

The marks of the internal assessment must be displayed on the notice board of the respective colleges with in a fortnight from the date of the test conducted. 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

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

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.

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.

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

Microbiology I

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

Subsidiary Subjects

English 25 Hours
Kannada 25 Hours
Health-Care 40 Hours
Clinical/Lab posting- 470 Hours Friday 9am - 1pm and 2pm - 4-30 pm
Saturday 9am - 1pm

Table - II Distribution of Teaching Hours in Second Year Subjects

Main Subjects

Sl. No.	Subject	Theory No. of Hours	Practical No. of Hours	Clinical posting	Total No. of Hours
1.	Medicine relevant to O.T & Anaesthesia. technology	50	--	--	50
2.	Section A Applied Pathology Section B Applied Microbiology	30 30	30 30	--	120
3.	Pharmacology	50	--	--	50
4.	Introduction to Anaesthesia & Operation Theatre Technology	80	100	650	830
	Total	240	160	650	105

Subsidiary Subjects:

Sociology 20 Hours
Constitution of India 10 Hours
Environmental Science & Health 10 Hours

Table -III Distribution of Teaching Hours in Third Year Subjects

Main Subjects

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

Subsidiary Subjects

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

3. 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.

4. 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.

Main Subjects shall have University Examination.

Subsidiary subjects: Examination for subsidiary subjects shall be conducted by respective colleges. Distribution of Subjects and marks for First Year, Second year & Third year University theory and practical Examinations are shown in the Table - IV, V & VI.

First year examination:

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

Second & Third year examination:

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

Written Examinations consists of
04 papers in the 2nd Year
03 papers in the 3rd Year.

Practical examination:

Two practical examinations, at the end 2nd Year and one practical examination at the end of the 3rd year.

TABLE-IV

Distribution of Subjects and marks for First Year University theory Examination

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

14. Eligibility for the award of Degree:

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

15. Distribution of Type of Questions and Marks

SUBJECTS HAVING MAXIMUM MARKS= 80 (for **First year)**		
Type of Questions	No. of Questions	Marks for Each Questions
Long Essay	1	10
Short Essay	5	5
Short Notes Type	5	3
Short Answer Type	10	2
MCQ's	10	1

1. Long essay- 1 Questions (answer any one)	1x10= 10 marks
2. Short essay- 7 Questions (answer any five)	05x5= 25 marks
3. Short Notes Type – 8 Questions (answer any five)	05x3= 15 marks
4. Short answer- 12 Questions (answer any ten)	10x2= 20 marks
5. MCQ's – 10 Questions	10x1= 10 marks
	Total= 80

SUBJECTS HAVING MAXIMUM MARKS= 80 (for **Second and Third Year)**		
Type of Questions	No. of Questions	Marks for Each Questions
Long Essay	1	10
Short Essay	5	5
Short Notes Type	5	3
Short Answer Type	10	2
MCQ's	10	1

1. Long essay- 1 Questions (answer any one)	1x10= 10 marks
2. Short essay- 7 Questions (answer any five)	05x5= 25 marks
3. Short Notes Type – 8 Questions (answer any five)	05x3= 15 marks
4. Short answer- 12 Questions (answer any ten)	10x2= 20 marks
5. MCQ's – 10 Questions	10x1= 10 marks
	Total= 80

SUBJECTS HAVING MAXIMUM MARKS= 80 (for **Subsidiary subjects)**		
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

Main Subjects shall have University Examination. There shall be no University Practical Examination.

TABLE - V
Distribution of Subjects and marks for Second Year Examination

		Theory				Practicals			
Paper	**Subject**	**Theory**		**IA**	**Sub Total**	**Univ Practical**	**IA**	**Sub Total**	**Grand Total**
i	**Section A – Applied Pathology**	40		20	100	40	10	50	200
	Section B – Applied Microbiology	40							
ii	**Introduction to Anaesthesia & OT Technology**	80		20	100	40	10	50	200
iii	**Applied Pharmacology**	80	--	20	100	No Practicals			100
iv	**Medicine Relevant to Anaesthesia & OT Technology**	80	--	20	100	No Practicals			100

Distribution of Subsidiary Subjects and marks for Second Year Examination

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

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

TABLE - VI
Distribution of Subjects and marks for Third Year Examination

		Theory				Practicals			
Paper	**Subject**	**Theory**	**--**	**IA**	**Sub Total**	**Univ Practical**	**IA**	**Sub Total**	**Grand Total**
i	**Anaesthesia & OT Technology - Clinical**	80	--	20	100	120 (40+40+40)	30 (10+10+ 10)	150	450
ii	**Anaesthesia & OT Technology - Applied**	80	--	20	100				
iii	**Anaesthesia & OT Technology - Advanced**	80	--	20	100				

* Practicals-One common practical for all the three papers with equal weightage of marks i.e. 40 practical marks and 10 I.A. marks for each paper.

Distribution of Subsidiary Subjects and marks for Third Year Examination

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

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

5. Pass criteria

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.

Second and Third year Examination

a. Main Subjects: A candidate is declared to have passed the Examination in a subject if he/she secures 50% of the marks in theory and 50% in practical separately. For a pass in theory, a candidate has to

secure a **minimum of 40% marks** in the University conducted written examination, and 50% in aggregate in the University conducted written examination, internal assessment and Viva-Voce added together and for pass in Practical, a candidate has to secure a minimum of 40% marks in the university conducted Practical/Clinical examination and 50% in aggregate i.e. University conducted Practical/Clinical and Internal Assessment.

In the third year a candidate is declared to have passed only if he/she passes all the three theory papers and one practical examination in a single attempt. Where in the candidate fails in one or more theory papers and or practical examination he/she will have to re appear for all the 3 theory papers and the practical examination in the subsequent attempt.

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

6. Carry over benefit

a) First year examination:

A candidate who fails in any two of the five main subjects of first year shall be permitted to carry over those subjects to second year. However, he/se must pass the carry over subjects before appearing for second year examination; otherwise he/she shall not permitted to proceed to third year.

b) 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

7. 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 be reflected in the marks card but 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 for clauses (a), (b) and (c)]

8. 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. On completion of 12 months of the internship with pass criteria in outgoing clinical assessment exams, the candidate is eligible for award of degree.

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STUDENT LEARNING OUTCOMES ALLIED HEALTH SCIENCES PROGRAMMES

- Employ critical thinking and innovation to analyze challenges, concepts, research, and clinical outcomes and apply them to professional practice.

- Analyze, interpret, integrate and evaluate information with the ability to communicate findings in a written or oral format.

- Demonstrate a broad-based and integrative understanding of basic biological, physical, chemical, and/or psychological concepts that prepare them for careers in health science.

- Approach patient care from a cultural humility perspective that respects varied backgrounds including but not limited to: cultural, social, religious, racial, gender, and ethnic diversity of the patient and family regarding disease and their health.

- Integrate concepts from various scientific fields to meet the requirements for entry-level healthcare administrative positions or admission to professional programs in allied health fields (e.g. athletic training, physical therapy, occupational therapy, physician assistant, chiropractic, etc)

INTENDED LEARNING OUTCOMES- COMMON FOR ALL SPECIALITY

COURSE TITLE	OUTCOMES	ASSESSMENT METHODS V-Verbal W-Written P-Practical
Anatomy	1. Define basic technical terminology and language associated with anatomy 2. Identify the structures of human body 3. Describe the anatomy of human body 4. Describe the structure and features of the organ systems of the human body 5. Identify the anatomical structure in the dissected specimen	W,P,V Internal [20]+ university [80] Total marks=100
Physiology	1. Describe the functional anatomy and histology of various organ systems 2. Describe the basic physiological principles involved in the normal functioning of the human body 3. Apply the physiological principles in comprehending the pathophysiology of disease and its management	W,P,V Internal [20]+ university [80] Total marks=100
Biochemistry	1. Describe chemistry & metabolism of macromolecules, vitamins and minerals 2. Correlate biochemical mechanisms to diseases 3. Discuss the importance of biochemical parameters in clinical decision making	W,P,V Internal [20]+ university [80] Total marks=100 Practical
Microbiology	1. Classify microorganisms, discuss the morphological and growth characteristics and its association with causation of disease 2. Demonstrate and interpret basic laboratory techniques used in the detection of micro organisms 3. Explain principles of antimicrobial therapy and Immunization 4. Demonstrate basic infection control practices	W,P,V Internal [20]+ university [80] Total marks=100
Pathology	1. Identify and Describe the causative agent in various disease 2. Comprehend the major signs and symptoms of the various diseases 3. Describe the pathophysiology of various disease related to anesthetic care Apply pathophysiology 4. knowledge in anesthetic care 5. To Analyze the patient pre-operative fit for undergoing procedure	W,P,V Internal [20]+ university [80] Total marks=100

LEARNING OUTCOMES - OT & ANAESTHESIA TECHNOLOGY

COURSE TITLE		OUTCOMES	ASSESSMENT METHODS V-Verbal,W-Written ,P-Practical
Applied Pharmacology		1.Describe the classification and dosage of drugs used in anesthetic care 2. Describe the pharmacokinetics and pharmacodynamics of commonly used anesthetic drugs	Internal [20]+ university [80] Total marks=100
Applied Science	Elective 1: Applied Microbiology	To determine the concepts of disease infectious diseases, skills in the evaluation of clinical data for laboratory diagnosis	Internal [10+10] University [40+40] Total marks=100 P- 40 IA- 10 =50 Total W+P = 150
	Elective 2: Applied Pathology	To determine the concepts of disease and outlines of clinical evaluation	
Introduction to Anaesthesia & OT Technology		1.Describe the fundamentals of General and Regional anesthesia 2. Demonstrate the airway management techniques in mannequins under supervision 3.Perform pre anesthetic assessment under supervision 4.Describe the procedures of Regional and general anesthe 5.Observe the regional anesthesia 4.Demonstrate various monitoring skills	Internal [20] University [80] Total marks=100 P=40 IA=10 Total +50 Total W+P=150
Medicine Related to OT &Anaesthesia Technology		1.Describe the various instrument used in anesthesia 2.Demonstrate the machine check and breathing syste 3.Identify the various equipments used in anesthetic care 4.Demonstrate the handling skills of equipments used in	Internal [20] University [80] Total marks=100
Anaesthesia Technology& OT Technology -Clinical		1.Describe various monitoring in cardio thoracic and neuro surgery. 2. Demonstrate ACLS and BLS in emergency lifesaving support 3. Analyze the special investigations in cardiac thoracic care 4.Apply knowledge e about advance pulmonary support ECMO and ventilation 4.	Internal [20] University [80] Total marks=100 P-40 IA=10 Total -50 Total W+P +150
Anaesthesia Technology & OT Technology-Applied		1.Discuss the indication and contraindication of day care anesthesia 2. Describe labor analgesia pain management. 3.Analyze PDPH Cause and management. 4.Apply various type and size calculation tube for pediatric and intra-operative management.	Internal [20] University [80] Total marks=100 P-40 IA=10 Total -50 Total W+P +150
Anaesthesia Technology & OT Technology-Advanced		1.Demonstrate the competency in handling patients with various disease of aging in geriatric anesthesia 2.Comprehend the management of cardio thoracic and neuro surgery patient	Internal [20] University [80] Total marks=100 P-40 IA=10 Total -50 Total W+P +150

FIRST YEAR B.Sc ANAESTHESIA AND OPERATION THEATRE TECHNOLOGY

ANATOMY

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

Theory: 70hrs

Practicals: 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.

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 O_2 & CO_2
Chemical regulation of respiration
Neural regulation of respiration
Hypoxia, Acclamatization,
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 physica,l 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

BIOCHEMISTRY

No. Theory classes: 70hours

No. of 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, Cobalamine, 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 reulating 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 asses 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, H_2SO_4, H_3PO_4, CH_3COOH 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

Total theory hours = 70

PRACTICAL DEMONSTRATION [20 hours]

- 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.

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:

g. Definition and signs of inflammation.

h. Types – Acute and chronic inflammation.

i. Acute inflammation – Causes, morphological patterns and outcome.

j. Chronic inflammation – Causes, morphology and examples.

k. Regeneration and repair – Mechanism of cutaneous wound healing.

l. 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
5. Histopathology- section cutting and H & E Staining (for BSc MLT only

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.

Microbiology I

Theory: 70 Hours

Practicals: 20 Hours

1. Introduction (6 hrs)

History of Microbiology,

Classification of microorganisms,

Microscope (Different types and uses)

Morphology of bacterial cell.

2. Growth and nutrition (6 hrs)

Growth and Nutrition

Multiplication of bacteria,

Culture media and Culture methods.

3. Sterilization and disinfection (6 hrs)

Principles and use of equipments of sterilization, Chemicals used in disinfection

4. Biomedical waste management principle and practice

5. Immunology (8 hrs)

Immunity (Innate and Acquired immunity)

Antigen (Definition, types, factors of antigenicity)

Antibody (Properties, Structures Classes of immunoglobulins)

List Antigen antibody reactions.

Vaccines

Immunization schedule

6. Infection (5hrs)

Definition, types and mode of transmission

Hospital infections – causative agents, mode of transmission and prophylaxis

Antimicrobial susceptibility testing

7. Systematic bacteriology (15 hrs)

Disease caused and lab diagnosis of medically important bacteria.

(Staphylococcus, Streptococcus, Gonococcus, Echerichia coli, Klebsiella, Proteus Salmonella, Shigella, Vibrio, Pseudomonas, Mycobacteria, Treponema,)

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

8. Parasitology (10hrs)

Introduction to Parasitology

List of medically important parasites and diseases

(E.histolytica, Plasmodium, Ascaris, Ancylostoma, W.bancrofti, Tape worm)

Lab diagnosis of parasitic infections

9. Virology (10 hrs)

Introduction to virology

List of medically important viruses and diseases

HIV, Hepatitis, Rabies, Polio,

Arboviruses (Chikungunya,Dengue,KFD,)

Lab diagnosis of viral infections

9. Mycology (9 hrs)

Introduction to Mycology

List of medically important fungi and diseases

(Candidiasis, Cryptococcosis, Dermatophytes, Aspergillosis and Mucor mycosis)

Lab diagnosis of fungal infections

11. Automated techniques

PRACTICALS (20hrs)

Compound Microscope

Demonstration and sterilization of equipments

Demonstration of commonly used culture media and media with growth

Antibiotic susceptibility test

Demonstration of common serological tests –widal, VDRL,

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 Practicals need not be sent to the university.

SUBSIDIARY SUBJECTS

SOCIOLOGY
Teaching Hours : 20

Course Description

This course will introduce student to the basic sociology concepts, principles and social process, social institutions [in relation to the individual, family and community and the various social factors affecting the family in rural and urban communities in India will be studied.

introduction :

Meaning – Definition and scope of sociology

Its relation to Anthropology, Psychology, Social Psychology

Methods of Sociological investigations – Case study, social survey, questionnaire, interview and opinion poll methods.

Importance of its study with special reference to health care professionals Social Factors

in Health and Disease:

Meaning of social factors

Role of social factors in health and disease

Socialization:

Meaning and nature of socialization

Primary, Secondary and Anticipatory socialization Agencies of socialization

Social Groups:

1. Concepts of social groups, influence of formal and informal groups on health and sickness.
2. The role of primary groups and secondary groups in the hospital and rehabilitation setup.

Family :

The family, meaning and definitions Functions of types of family Changing family patterns

Influence of family on individual's health, family and nutrition, the effects of sickness in the family and psychosomatic disease and their importance to physiotherapy

Community :
Rural community: Meaning and features – Health hazards to rural communities, health hazards to tribal community.

Urban community – Meaning and features – Health hazards of urbanities

Culture and Health :

Concept of Health Concept of culture Culture and Health

Culture and Health Disorders

Social Change :

Meaning of social changes Factors of social changes

Human adaptation and social change Social change and stress

Social change and deviance

Social change and health programme

The role of social planning in the improvement of health and

rehabilitation Social Problems of disabled :

Consequences of the following social problems in relation to sickness and disability

remedies to prevent these problems

Population explosion Poverty and unemployment Beggary

Juvenile delinquency Prostitution Alcoholism

Problems of women in employment

Social Security :

Social Security and social legislation in relation to the disabled

Social Work :

Meaning of Social Work

The role of a Medical Social Worker

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 he structure of sentences The structure of paragraphs Enlargements of Vocabulary

UNIT - III: WRITTEN COMPOSITION:

Precise writing and summarizing Writing of bibliography Enlargement of Vocabulary

UNIT - IV: READING AND COMPREHENSION:

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

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

Paragraph, Essay, Letter, Summary, Practice in writing

UNIT - VI: VERBAL COMMUNICATION:

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

Scheme of Examination

Written (Theory): Maximum Marks: –80 marks. No Practical or Viva voce examination

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

REFERENCE

1. English Grammar Collins, Birmingham University, International Language Data Base, Rupa & Co. 1993

2. Wren and Martin - Grammar and Composition, 1989, Chanda & Co, Delhi

3. Letters for all Occasions. A S Myers. Pub - Harper Perennial

4. Spoken English V. Shasikumar and P V Dhanija. Pub. By: Tata Mcgraw

Hill, New Delhi

5. Journalism Made Simple D Wainwright

6. Writers Basic Bookself Series, Writers Digest series

7. Interviewing by Joan Clayton Platkon

8. Penguin Book of Interviews.

BIO STATISTICS

Time Allotted: 20 Hours Course Description:

Introduction to basic statistical concepts: methods of statistical analysis; and

interpretation of data Behavioural Objectives:

Understands statistical terms.

Possesses knowledge and skill in the use of basic statistical and research methodology.

Unit – I : Introduction

Meaning, definition, characteristics of statistics. Importance of the study of statistics.

Branches of statistics.

Statistics and health science including nursing. Parameters and estimates.

Descriptive and inferential statistics. Variables and their types.

Measurement scales

Unit – II :Tabulation of Data Raw data, the array, frequency distribution. Basic principles of graphical representation.

Types of diagrams - histograms, frequency polygons, smooth frequency polygon, commulative frequency curve, ogive.

Normal probability curve.

Unit - III : Measure of Central Tendency Need for measures of central tendency

Definition and calculaton of mean - ungrouped and grouped

Meaning, interpretation and calculation of median

ungrouped and grouped. Meaning and calculation of mode.

Comparison of the mean, and mode.

Guidelines for the use of various measures of central tendency.

Unit - IV :Measure of Variability Need for measure of dispression. The range, the average deviation. The variance and standard deviation. Calculation of variance and standard deviation ungrouped and grouped. Properties and uses of variance and SO

Unit -V : Probability and Standard Distributions. Meaning of probability of standard distribution. The Binominal distribution. The normal distribution. Divergence from normality - skewness, kurtosis. Samling Techniquor sampling - Criteria for good samples. Application of sampling in Community. Procedures of sampling and sampling

designs errors. Sampling variation and tests of significance.

Unit - VII : Health Indicator Importance of health Indicator.

Indicators of population, morbidity, mortality, health services. Calculation of rates and rations of health. Recommended Books. B.K. Mahajan & M. Gupta (1995) Text Book of Preventive & Social Medicine, 2002, 17th Edition Jaypee Broth

SECOND YEAR B.Sc ANAESTHESIA AND OPERATION THEATRE TECHNOLOGY

Course Contents Second Year Main Subjects

APPLIED PHARMACOLOGY

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

I. Autonomic nerves system.

- Anatomy & functional organisation.
- List of drugs acting on ANS including dose, route of administration, indications, contra indications and adverse effects.

II. Cardiovascular drugs- Enumerate the mode of action, side effects and therapeutic uses of the following drugs.

a. Antihypertensives
- Beta Adrenergic antagonists
- Alpha Adrenergic antagonists
- Peripheral Vasodilators
- Calcium channel blockers

b. Antiarrhythmic drugs
c. Cardiac glycosides
d. Sympathetic and nonsympathetic inotropic agents.
e. Coronary vasodilators.
f. Antianginal and anti failure agents
g. Lipid lowering & anti atherosclerotic drugs.
h. Drugs used in Haemostasis - anticoagulants Thrombolytics and antithrombolytics.
i. Cardioplegic drugs- History, Principles and types of cardioplagia.
j. Primary solutions - History, principles & types.
k. Drugs used in the treatment of shock.

III. Anaesthetic agents.

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

IV. Analgesics

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

V. Antihistamines and antiemetics-

- Classification, Mechanism of action, adverse effects, Preparations, dose and routes and administration.

VI. CNS stimulants and depressants

- Alcohol
- Sedatives, hypnotics and narcotics
- CNS stimulants
- Neuromuscular blocking agents and muscle relaxants.

VII. Pharmacological protection of organs during CPB VIII.Inhalational gases and emergency drugs.

IX. Pharmacotherapy of respiratory disorders

- Introduction - Modulators of bronchial smooth muscle tone and pulmonary vascular smooth muscle btone
- Pharmacotherapy of bronchial asthma
- Pharmacotherapy of cough
- Mucokinetic and mucolytic agents
- Use of bland aerosols in respiratory care.

X. Corticosteroids - Classification, mechanism of action, adverse effects and complications. Preparation, dose and routes of administration.

XI. Diuretics

- Renal physiology
- Side of action of diuretics
- Adverse effects
- Preparations, dose and routes of administrion.

XII. Chemotherapy of infections

- Definition

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

XIII. Miscellaneous.

- IV fluids- various preparations and their usage.
- Electrolyte supplements
- Immunosuppressive agents
- New drugs included in Anaesthesia and Operation Theatre technology.
- Drugs used in metabolic and electrolyte imbala

PRACTICALS:

1. Preparation and prescription of drugs of relevance.
2. Experimental pharmacology directed to show the effects of commonly used drugs of relevance and interpretation of few charts.

NO PRACTICAL EXAMINATION

Recommended Books.

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

APPLIED PATHOLOGY

I. CARDIOVASCULAR SYSTEM

- Atherosclerosis- Definition, risk factors, briefly Pathogenesis & morphology, clinical significance and prevention.
- Hypertension- Definition, types and briefly Pathogenesis and effects of Hypertension.
- Aneurysms - Definition, classification, Pathology and complications.
- Pathophysiology of Heart failure.
- Cardiac hypertrophy - causes, Pathophysiology & Progression to Heart Failure.
- Ischaemic heart diseases- Definition, Types. Pathophysiology, in brief Pathology & Complications of various types of IHD.
- Valvular Heart diseases- causes, Pathology & complication. Complications of artificial valves.
- Cardiomyopathy - Definition, Types, causes and significance.
- Pericardial effusion- causes, effects and diagnosis.
- Congenital heart diseases - Basic defect and effects of important types of congenital heart diseases.

II. HAEMATOLOGY

- Anaemia - Definition, morphological types and diagnosis of anaemia. Brief concept about Haemolytic anaemia and polycythaemia.
- Leukocyte disorders- Briefly leukaemia, leukocytosis, agranulocytosis etc.,
- Bleeding disorders- Definition, classification, causes & effects of important types of bleeding disorders. Briefly various laboratory tests used to diagnose bleeding disorders.

III. RESPIRATORY SYSTEM

- Chronic obstructive airway diseases - Definition and types. causes, Pathology & complications of each type of COPD in brief.
- Briefly concept about obstructive versus restrictive pulmonary disease.
- Pneumoconiosis- Definition, types, Pathology and effects in brief.
- Pulmonary congestion and edema.
- Pleural effusion - causes, effects and diagnosis.

IV. RENAL SYSTEM

- Clinical manifestations of renal diseases. Briefly the causes, mechanism, effects and laboratory diagnosis of ARF & CRF. Briefly Glomerulonephritis and Pyelonephritis.
- End stage renal disease - Definition, causes, effects and role of dialysis and renal transplantation in its management.
- Brief concept about obstructive uropathy.

PRACTICALS

1. Description & diagnosis of the following gross specimens.
   a. Atherosclerosis.
   b. Aortic aneurysm.
   c. Myocardial infraction.
   d. Emphysema
   e. Chronic glomerulonephritis.
   f. Chronic pyelonephritis.

2. Interpretation & diagnosis of the following charts.
   a. Hematology Chart - AML, CML, Hemophilia, neutrophilia, eosinophilia.
   b. Urine Chart - ARF, CRF, Acute glomerulonephritis.

3. Estimation of Hemoglobin.
4. Estimation Bleeding & Clotting time.

PRACTICAL EXAMINATION - 40 Marks.

There will be a Combined Practical examination for Applied Pathology & Applied Microbiology (20 marks each)

Applied Pathology:

Sl.No.	Tests	Marks
1.	Interpretation of Hematology Chart	05
2.	Interpretation of Urine Chart Estimation of Hemoglobin	05
3.	Estimation of Bleeding time & Clotting time	05
4.	Estimation of Bleeding time & Clotting time	05
	Total	20

APPLIED MICROBIOLOGY

THEORY - 40 HOURS

1. Health care associated infections and Antimicrobial resistance: Infections that patients acquire during the course of receiving treatment for other conditions within a healthcare setting like Methicillin Resistant Staphylococcus aureus infections, Infections caused by Clostriduium difficle, Vancomycin resistant enterococci etc. Catheter related blood stream infections, Ventilator associated pneumonia, Catheter Related urinary tract infections, Surveillance of emerging resistance and changing flora. The impact and cost attributed to Hospital Associated infection. 6 Hours

2. Disease communicable to Healthcare workers in hospital set up and its preventive measure: Occupationally acquired infections in healthcare professionals by respiratory route (tuberculosis, varicella-zoster, respiratory synctial virus etc), blood borne transmission (HIV, Hepatitis B, Hepatitis C, Cytomegalovirus, Ebola virus etc), oro faecal route (Salmonella, Hepatitis A etc), direct contact (Herpes Simplex Virus etc). Preventive measures to combat the spread of these infections by monitoring and control. 6 Hours

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

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

4. Importance of sterilization:
   a. Disinfection of instruments used in patient care: Classification, different methods, advantages and disadvantages of the various methods.
   b. Disinfection of the patient care unit
   c. Infection control measures for ICU's 10 Hours
5. Sterilization:
   a. Rooms: Gaseous sterilization, One Atmosphere Uniform Glow Discharge Plasma (OAUGDP).
   b. Equipments: classification of the instruments and appropriate methods of sterilization.
   c. Central supply sterile department: the four areas and the floor plan for instrument cleaning, high-level disinfecting and sterilizing areas. 8 Hours
6. Preparation of materials for autoclaving: Packing of different types of materials, loading, holding time and unloading. 4 Hours

PRACTICALS- 30 HOURS

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

PRACTICAL EXAMINATION - 40 Marks.

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

(20 marks each)
Applied Microbiology:

Sl. No.	Tests	Marks
1.	Dry heat / Moist heat: Temperature recording charts interpretation	05
2.	Dry heat / Moist heat: Color change indicators interpretation	05
3.	Air sampling culture plates interpretation of Colony forming units based on air flow rate and sampling time	05
4.	Interpretation of Sterility of Hemodialysis water/Distilled water /Deionised water based on growth of colonies in BHI agar to be reported as X CFU/mL	05
	Total	20

MEDICINE RELEVANT TO ANAESTHESIA & OPERATION THEATRE TECHNOLOGY

Diabetes Mellitus
Hypertension
Ischaemic heart disease
Obesity
Elderly Patient
Pregnancy
Shock
COPD
Chronic renal failure Chronic liverdisease/failure Anaemia
PediatricpatientInfant/Neonate Epilepsy
CVA

NO PRACTICAL EXAMINATION

INTRODUCTION TO ANAESTHESIA & OPERATION THEATRE TECHNOLOGY

1. Physical layout of surgical suite
   - Transition zones
   - Location
   - Peripheral support areas
   - Layout of operation theatre
   - Special procedure rooms

2. Care of perioperative environment
   - Establishing surgical environment
   - Transportation of patient to the O.T
   - Environmental,physical,chemical,and biological hazards
   - Appropriate operating room attire

3. Sterilization of instruments and O.T cleaning
   - Daily terminal cleaning
   - Decontamination and disinfection & sterilization
   - ♦ Definition
   - ♦ Thermal sterilization
   - ♦ Autoclaving
   - ♦ CSSD & its functioning
   - General care and testing of instruments
   - Assembly and packing of instruments
   - WHO checklist (safe surgery)

4. Biomedical waste management
5. Anaesthesia machine
   - Central gas supply
   - Safety features of anaesthesia machine
   - Medical gas cylinders
   - Pressure control system
   - Flow meters

- Vaporizers

6. Anaesthesia techniques
   - History
   - Pre-operative, intra-operative and post- operative care of patients
   - General anaesthesia
   - Regional anaesthesia
   - Combined spinal and epidural anaesthesia
   - Neuraxial blockades
   - Positioning the patients
7. Intraoperative monitoring
   - Pulse oximetery
   - Capnography
   - ECG monitoring
   - NIBP
   - IBP
   - CVP
   - Temperature
   - TEE
   - BIS
   - NEUROMUSCULAR MONITORING
8. Airway equipments
   - Supraglottic airway devices including igel,LMA,BASKA MASK,etc
   - Face mask
   - Airways
   - Combitube
   - AMBU bag
   - Intubation devices
   - Different types of Laryngoscopes
   - Endotracheal tubes
   - Flexible fiberoptic bronchoscope

9. Breathing systems
   - Classifications
   - Oxygen therapy
   - Mechanical ventilation

10. Difficult airway management devices
    - Indications and contraindications
    - Retrograde intubation
    - Cricothyroidectomy
    - Tracheostomy
    - Styllet, bougies
    - Jet ventilation
    - Video laryngoscopes
11. Equipments used inside OT
    - Humidifier
    - Warming devices
    - Suction equipment
    - Peripheral nerve stimulator
    - Defibrillator
    - Infusion pump
    - Nerve locator
    - Diathermy or cautery device
    - OT lights
    - Scavenging systems
    - Basic introduction to laparoscopy unit including insufflators, cameras, telescope etc
12. Anaesthetic agents
    - Premedication
    - Analgesics
    - Muscle relaxants
    - Inhalational agents
    - Emergency drugs
    - Induction agents
    - Sedatives
    - Local anaesthetics
    - IV fluids
    - Blood transfusion
    - Antiemetics

13. Principles of monitored anaesthesia care-MAC

14. Introduction to CPR/resuscitation- BLS

PRACTICAL EXAMINATION - 40 Marks

Subsidiary Subjects

SOCIOLOGY

Teaching Hours : 20

Course Description

This course will introduce student to the basic sociology concepts, principles and social process, social institutions [in relation to the individual, family and community and the various social factors affecting the family in rural and urban communities in India will be studied.

Introduction :

Meaning - Definition and scope of sociology
Its relation to Anthropology, Psychology, Social Psychology
Methods of Sociological investigations - Case study, social survey, questionnaire, interview and opinion poll methods.
Importance of its study with special reference to health care professionals

Social Factors in Health and Disease:

Meaning of social factors
Role of social factors in health and disease

Socialization :

Meaning and nature of socialization
Primary, Secondary and Anticipatory
socialization Agencies of socialization

Social Groups:

1. Concepts of social groups, influence of formal and informal groups on health and sickness. The role of primary groups and secondary groups in the hospital and rehabilitation setup.

Family :

The family, meaning and definitions Functions of types of family Changing family patterns Influence of family on individual's health, family and nutrition, the effects of sickness in the family and psychosomatic disease and their importance to physiotherapy

Community :

Rural community: Meaning and features - Health hazards to rural communities, health hazards to tribal community.

Urban community - Meaning and features - Health hazards of urbanities

Culture and Health :

Concept of Health Concept of culture Culture and Health Culture and Health Disorders

Social Change :

Meaning of social changes Factors of social changes Human adaptation and social change Social change and stress Social change and deviance Social change and health programme.The role of social planning in the improvement of health and rehabilitation

Social Problems of disabled :

Consequences of the following social problems in relation to sickness and disability remedies to prevent these problems Population explosion Poverty and unemployment Beggary Juvenile delinquency Prostitution Alcoholism Problems of women in employment

Social Security :

Social Security and social legislation in relation to the disabled

Social Work :

Meaning of Social Work
The role of a Medical Social Worker

INDIAN CONSTITUTION

Prescribed for the First Year students of all degree classes

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

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

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

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

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

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

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

Unit - VIII:
Method of amending the Constitution.

Unit - IX:
Enforcing rights through Writs:

Unit - X:
Constitution and Sustainable Development in India.

Books:

1. J.C. Johari: The Constitution of India- A Politico-Legal Study-Sterling Publication, Pvt. Ltd. New Delhi.

2. J.N . Pandey: Constitution Law of India, Allahbad, Central Law Agency, 1998.

3. Granville Austin: The Indian Constitution - Corner Stone of a Nation-Oxford, New Delhi, 2000.

Environment Science And Health

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

Recommended Books.

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

THIRD YEAR B.Sc ANAESTHESIA AND OPERATION THEATRE TECHNOLOGY

COURSE CONTENS OF THIRD YEAR MAIN SUBJECTS

PART-I ANAESTHESIA & OPERATION THEATRE TECHNOLOGY – CLINICAL

1. Surgical asepsis& sterile technique
    - Principles of asepsis & sterile techniques
    - Transmission of microorganisms
    - Human-borne and non-human borne sources of contamination
    - Standard precautions
2. Personnel care & hand asepsis
    - Appropriate operating room attire
    - Surgical hand and skin cleansing
    - Gowning and gloving
3. Surgical instruments &equipments
    - Fabrication
    - Classification
    - Powered surgical instruments
    - Handling instruments
    - Microsurgical instruments
4. Pre-operative preparation
    - Pre-anaesthetic assessment
    - Checking of all relevant records, importance of pre op protocols
    - Informed consent
    - Investigations check list with all images

5. Pre op –wheeling in
    - Iv access
    - Premedication
    - Detailed account on positioning and expected skills/knowledge
    - Assistance to anesthesiologist in conducting regional techniques including epidurals, nerve blocks or spinal.-relevant skill/knowledge
    - Assistance in conducting central venous access or intra arterial lines as reqd -knowledge /skill

6. Intra-operative patient care including managing hemodynamics ,use of appropriate drugs among others
7. Post- operative care
    - Reversal
    - Extubation
    - Transfer of patient
    - Fluid management

- Pain management

8. General surgery
    - Breast procedures
        - General principles
        - Surgical procedures and preparation
        - Positioning and surgical instruments
        - Technique and special considerations
        - Post-operative care

9. Abdominal surgery
    - Biliary tract procedures
    - Liver procedures
    - Spleen procedures
    - Pancreatic procedures
    - Oesophageal procedures
    - Gastric procedures
    - Intestinal procedures
10. Colorectal procedures
11. Anorectal procedures
12. Hernia procedures
13. Amputation of extremities
14. Laproscopic surgeries
15. Cancer surgeries
16. Orthopedic surgerys
    - Principles: Basic knowledge of implants screws, k wires,steiman poins,plates,nails
    - Wound debraidment
    - Tendon repair
    - Excision of ganglion
    - Carpel tunnel release
    - Principles of fracture reduction – closed & open
    - Use of C ARM
    - Nailing of Long bone fractures
    - Nailing of femoral shaft fracture
    - Ankle and foot surgeries
    - Humerus fixation- nailing and plating
    - Hand surgeries
    - Forearm fracturs – nailing and plating
    - Spine surgeries- dicectomy/instrumentation
    - Replacement surgeries-principles, TKR,THR
    - Arthroplasty, arthroscopy
    - Amputations
17. Obstetrics & gynaecology
    - General principles
    - The surgical preparation and technique
    - Positioning

- Surgical equipments
- Normal labour
- LSCS

- Dilatation of the cervix and curettage
- Hysterectomy
- Vaginal
- Total abdominal
- Ectopic Pregnancy
- Post-partum female sterilization/tubectomy –laparascopic /open
- Myomectomy
- Principles of laparoscopic gynecologoical procedures
- IVF

18. ENT Surgery **6hrs**

- General principles
- The surgical preparation and technique
- Positioning
- Surgical equipments for

  - Tonsillectomy
  - Adenoidectomy
    - Tracheostomy
    - Myringoplasty
    - Mastoidectomy
    - Tympanoplasty
    - Radical neck dissection
    - Turbinectomy
    - Septoplasty
    - Rhinoplasty
    - FESS
    - Thyroidectomy

19. Ophthalmic Surgery **5hrs**

- General Principles
- The surgical preparation and technique
- Positioning
- Surgical equipments
- Excision of Chalazion
- Iridectomy
- Cornal Transplants
- Cataract
- Glaucoma
- RefractiveKeratoplasty
- Lacrimal Duct Dilatation

20. Neurosurgery **6hrs**

- General principles
- The surgical preparation
- Positioning

- Surgical instruments
- Technique
- Special considerations
- Post-operative care.
- Craniotomy
- VP shunt
- Burr hole
- Awake craniotomy
- Spine surgeries
- Aneurysm surgeries

21. Urology **5hrs**

- General principles
- The surgical preparation
- Positioning
- Surgical instruments
- Technique
- Special considerations
- Post-operative care
- PCNL
- ESWL
- Renal transplantation
- TURP
- Cystoscopy
- Nephrectomy
- AV Fistula

22. Cardio Thoracic surgery **5hrs**

- General principles
- The surgical preparation
- Positioning
- Surgical instruments
- Technique
- Special considerations
- Post-operative care
- CABG
- Valve replacement surgeries
- Lung isolation
- Chest injury
- ICD
- Pulmonary lobotomy
- Thoracoplasty
- ASD and VSD closure

23. Plastic , Reconstructive & Vascular surgery **5hrs**

- General principles
- The surgical preparation
- Positioning
- Cosmetic Rhinoplasty
- Lipo suction
- Scar excision /revision Z plasty
- Skin grafting
- Burns- Acute & reconstructive management

24. Paediatric surgery **5hrs**

- General principles
- The surgical preparation
- Positioning
- Surgical instruments
- Technique
- Special considerations
- Post-operative care
- Urethroplasty
- Colostomy
- Cystoscopy
- .Appendicectomy

PRACTICAL EXAMINATION

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

PART-II ANAESTHESIA & OPERATION THEATRE TECHNOLOGY – APPLIED

1. Airway management **15hrs**
    - Airway assessment
    - Management of obstructed airway
        - Triple maneuver
        - Gadgets to manage airway obstruction
        - Laryngoscopy and intubation
        - Surgical airway
    - Airway management technique
        - Ventilation with a face mask
        - Endotracheal intubation
        - Fiberoptic Endotracheal intubation
            - Airway blocks
            - Preparation
            - Technique of fibre optic intubation

    - Difficult airway management
    - Use of LMA/different gadgets
    - Proper use of stylette/bougie
    - Retrograde tracheal intubation
    - Trans tracheal techniques
        - Cricothyrotomy
        - PCDT
    - Complications of tracheal intubation
    - Airway management in infants and children
        - Airway difference between infants and adults
        - Managing the normal airway in infants and children
        - Managing the difficult airways in infants and children
        - Tracheal extubation in infants and children

2. Anaesthetic monitoring **12hrs**
    - Electrocardiography
    - Blood pressure monitoring
        - Non invasive
        - Invasive
    - Pulse oximetry
    - Capnography
    - Central venous pressure monitoring
    - Pulmonary artery pressure monitoring
    - Trans Oesophageal Echocardiography
    - Temperature monitoring
    - Blood gas analysis
    - Airway pressure monitoring
    - Neuromuscular monitoring

- BispectralIndex(BIS)-

3. Anaesthesia outside the operating room **8hrs**
    - Non invasive radiographic procedure
    - CT consoles
    - MRI units
        - Safety considerations
        - Monitoring issues
        - Compatible equipment
        - Management of anaesthesia
    - Invasive radiographic procedure
        - Angiography
    - Radiation therapy
    - Electro convulsive therapy
    - Extra corporeal shock wave lithotripsy
    - Dental chair procedures
    - Endoscopy –ERCP
    - Colonoscopy
    - IVF procedure
    - Labour analgesia
    - Anaesthesia in cath lab –procedures in cath lab

4. Acute post-operative pain management **8hrs**
    - Analgesic delivery system
        - Oral administration
        - Intra muscular administration
        - Intravenous administration
        - Patient controlled analgesia
        - Neuraxial analgesia
    - Alternative approach to management of Acute post operative pain
        - Peripheral nerve blocks
        - TENS

5. Concept and idea of recovery room **5hrs**
    - Requisite skill and knowledge to deal with immediate post op problems like
        - severe shivering, chills,
        - possible airway problems,
        - hypotension,
        - drain care,
        - oxygen supplementation,
        - assesment of pain and need of analgesics,
        - Post op vomiting

6. Fluid management **5hrs**
    - Pre operative considerations
    - Perioperative fluid therapy – quantitative considerations - Pre existing fluid deficit, Maintenance requirement, Surgical fluid losses

- Types and choice of fluids with respect to colloids /crystalloids
- Precautions on special cases like paediatrics, renal patients, elderly, cardiac patients etc
- Use of pressure bags

7. Blood therapy **8hrs**
    - Assessment of blood loss
    - Blood groups
    - Cross matching
    - Blood components
    - Blood transfusion
        - Indications
        - Complications
    - Autologous blood transfusion
    - Mismatched blood transfusion

25hrs

8. Medical emergencies in the intra operative period
    - Difficult airway
        - Difficult mask ventilation
        - Difficult intubation
        - CVCI
    - Hypoxia
    - Tight bag
    - Bronchospasm
    - Laryngospasm
    - Hypertension
    - Hypotension
    - Bradycardia
    - Tachycardia
    - Hypothermia
    - Arrhythmia
    - Hyperthermia-Malignant hyperthermia
    - Shivering
    - Raised ICT
    - Hypercarbia
    - Thyrotoxicosis
    - High spinal
    - Total spinal
    - Anaphylaxis
    - Pulmonary edema
    - DIC
    - Mismatched blood transfusion
    - TURP syndrome
    - LA toxicity
    - Emergency LSCS
    - PPH

- Intraoperative cardiac arrest
- Post-operative restlessness
- OT fire & electrical mishap
- Concept of emergency surgeries and emergency preparedness in OT

9. Post Anaesthesia recovery **6hrs**
    - Admission to the post anaesthesia care unit (PACU)
    - Airway obstruction
        - Loss of pharyngeal muscle tone
        - Residual neuromuscular blockade
        - Laryngospasm
        - Airway edema
        - Management of upper airway obstruction
    - Post-operative de saturation
        - Hypoventilation
    - Pulmonary edema
        - Post obstructive pulmonary edema
        - Transfusion-related lung injury
    - Hemodynamic Instability
        - Systemic hypertension
        - Systemic hypotension
        - Myocardial ischemia
        - Cardiac disrhythmias
    - Post-operative restlessness
        - Risk factors
        - Management
    - Renal dysfunction
        - Oliguria secondary to depletion of intravascular fluid volume
        - Intra- abdominal hypertension
        - Rhabdomyolysis
    - Body temperature and shivering
        - Mechanism
        - Treatment
        - Clinical effects
    - Post-operative nausea and vomiting
        - High risk patients
        - Prevention and treatment
    - Post-operative bleeding
    - Delayed recovery
        - Treatment
    - Criteria for discharge from PACU

PRACTICAL EXAMINATION

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

PART-III ANAESTHESIA & OPERATION THEATRE TECHNOLOGY – ADVANCED

1. **Introduction/ General Concepts**
    - Death in ICU: Ethical consideration
    - EOL issues – concept of DNR/DNI
    - Informed consent
    - Universal precautions : Protecting the practitioner

2. **Monitoring & Diagnostic Procedures in ICU** **10 Hrs**
    - Invasive pressure monitoring: general principles
    - Non-invasive cardiovascular monitoring
    - Monitoring tissueAnaesthesia and Operation Theatre & oxygenation
    - Bedside assessment & monitoring of pulmonary function & power of breathing in the critically ill
    - Echocardiography- point of care
    - Blood volume measurements in critical care
    - Radiologic imaging & bedside ultrasound in the intensive care unit

3. **Techniques, Procedures & Treatment**
    - Clean & aseptic techniques at the bed side
    - Vascular Cannulation
        - Central venous
        - Arterial
    - Temporary cardiac pacemakers
    - Feeding tube placement.
    - Urinary catheter & Endotracheal tube care
    - Blood & blood products transfusion
    - Tracheostomy & care of tracheotomised patient

4. **General Care of the Patient in ICU** **5hrs**
    - Bed care
    - Eye care
    - Bladder care
    - Care of mechanically ventilated patient
    - Vascular lines- arterial, venous line
    - Intensive spirometry
    - Introduction to BUNDLES and FAST HUG in ICU

5. **Nutrition and Toxicology** **6hrs**
    - Nutritional issues
    - Fluid balance
    - Parenteral nutrition
    - Practical aspects of TPN & enteral nutrition
    - Toxicology
    - Substance abuse & withdrawal : Alcohol ,cocaine, opioids & other drugs
    - Transfusion reactions

6. The Surgical Patient **7hrs**

- Initial management of the trauma patient
- Secondary & tertiary triage of the trauma patient
- Surgical & post-surgical bleeding
- Abdominal trauma: Non operative management & postoperative considerations
- Burn injury : Thermal & electrical

7. Infectious Disease **8hrs**

- Basic concept of infection control and rational antibiotic use
- Antibiotic resistance
- The role of antibiotics in the management of serious hospital acquired infections
- An approach to the febrile ICU patient
- Skin wounds & musculoskeletal infection
- Catheter related Blood stream infections
- Human immune deficiency virus in the intensive care intensive care unit
- Bed sore management
- Surgical Site Infections- Classification, diagnosis & management

8. Respiratory Disorders **6hrs**

- Mechanical ventilation
- Non-invasive ventilatory support modes
- Invasive ventilatory support modes-basic modes
- Oxygen therapy & basic respiratory care
- Aspiration
- Severe asthma
- Acute respiratory failure in chronic obstructive pulmonary disease
- Chest physiotherapy, positioning for drainage & respiratory exercises

9. Neurologic Disease & Dysfunction **4hrs**

- Sedation score
- Elevated intracranial pressure
- Altered consciousness & coma in the ICU
- Seizures & status epilepticus
- Neurological evaluation /monitoring
- Glasgow coma scale

10. Cardiovascular Disease & Dysfunction **3hrs**

- Cardiovascular failure
- Ionotropic support
- Vasodilator drugs
- Arrhythmias

11. Specialized Management Issues: Disaster Management **2hrs**

- Mass casualty incidents: Organizational & triage management issues that impact critical care
- Disaster response
- Code yellow

12. Resuscitation **5hrs**

- ABC
- BLS
- ACLS
- ALGORITHMS

13. Transportation

- Trauma management
- Disaster management
- Triaging
- Patient safety during transport
- Cervical spine injury & patient transfer
- Patient transfer
  - Types- Interhospital & Intrahospital

Practical/Demonstration: **30hrs**

- Universal precautions in ICU
- Hand hygiene
- Informed consent
- Setting of peripheral line & catheterization tray
- Setting of emergency airway equipments trolley
- Setting of emergency drug trolley
- Setting of ventilator
- Setting of Infusion pumps
- Setting of defibrillator
- Setting and preparation for arterial blood pressure monitoring line
- Setting and preparation of tracheostomy set
- Setting of CVP monitoring set
- BLS and ACLS in ICU
- Parenteral nutrition in ICU

PRACTICAL EXAMINATION

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

Subsidiary Subjects

BIO STATISTICS

Time Allotted: 20 Hours

Course Description:

Introduction to basic statistical concepts: methods of statistical analysis; and interpretation of data

Behavioural Objectives:

Understands statistical terms.
Possesses knowledge and skill in the use of basic statistical and research methodology.

Unit -I : Introduction

Meaning, definition, characteristics of statistics. Importance of the study of statistics.
Branches of statistics. Statistics and health science including nursing. Parameters and estimates.
Descriptive and inferential statistics. Variables and their types. Measurement scales

Unit - II: Tabulation of Data

Raw data, the array, frequency istribution. Basic principles of graphical representation.
Types of diagrams - histograms, frequency polygons, smooth frequency polygon, commulative frequency curve, ogive. Normal probability curve.

Unit - III : Measure of Central Tendency

Need for measures of central tendency Definition and calculaton of mean - ungrouped and grouped Meaning, interpretation and calculation of median ungrouped and grouped. Meaning and calculation of mode. Comparison of the mean, and mode. Guidelines for the use of various measures of central tendency.

Unit - IV : Measure of Variability

Need for measure of dispression. The range, the average deviation. The variance and standard deviation. Calculation of variance and standard deviation ungrouped and grouped. Properties and uses of variance and SO

Unit -V : Probability and Standard Distributions.

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

Unit - VI : Samling Techniques

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

Unit - VII : Health Indicator

Importance of health Indicator. Indicators of population, morbidity, mortality, health services. Calculation of rates and rations of health.

Recommended Books.

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

BASICS IN COMPUTER APPLICATIONS

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

Introduction to Data processing :

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

Hardware Concepts :

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

Concept of Software.

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

Basic Anatomy of Computers Principles of programming

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

Data processing Computers in physical therapy - principles in EMG, Exercise testing equipment, Laser. Scheme of Examination for MEDICAL ELECTRONICS including COMPUTER APPLICATIONS One Written (Theory) paper: Maximum Marks: - 80 marks.
No Practical or Viva voce examination

CLINICAL TRAINING

Content and purpose

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

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

i. Fo rthe students to become familiar with some of the practical applications of the academic course
ii. To introduce the wider hospital setting
iii. To help the students to identify the various disciplines within a hospital, their role and the importance of cooperation.
iv. To introduce patients in a clinical setting and begin to acquire basic communication skills.

2nd year : Skills Necessary to work in a Hospital

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

General procedures to be observed when patients attend for appointment :

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

Correct procedures when dealing with patients with infectious diseases

- University precautions.

Correct procedures when dealing with immuno-compromised patients :

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

Care of patients with :

- Breathing difficulties
- Terminal illness
- Mental impairment
- Physical disability
- Special care of the geriatric and pediatric patient
- Stoma care
- Handling of patients with bone metastases
- Care of the patient following an anaesthetic
- Care of lines in the incubated patient
- Communication skills with patients and relatives
- Terminally ill and Hospice

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

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

In the department :

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

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

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

iv. Introduce the students to the staff of the department.

v. Help the student to understand team roles.

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

Equipments and Integration :

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

Safety & Precautions in Practice :

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

To Achieve Clinical Competence

The purpose of this phase is for the students to :

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

To achieve final competency substantial time will be spent :

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

Graded Responsibility (structured training schedule)

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

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

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

Rotation posting

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

Monitoring Learning Progress

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

The learning out comes to be assessed should included :

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

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

1. **Periodic tests :**
   The departments may conductperiodic tests (Internal Assessment), the tests may include written papers, practical with viva voce. Work diary / Log, Personal Atitudes.

The essential items are :

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

3. Acquisition of Knowledge :

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

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

4. Technical skills

Day to day work : Skills on the machines should be assessed periodically. The assessment should include the candidates' sincerity and punctuality, analytical ability and communication skills.

Clinical and procedural skills : The candidate should be given graded responsibility to enable learning by apprenticeship. The performance is assessed by the guide by direct observation. Particulars are recorded by the student in the log book.

5. Teaching Skills :

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

6. Records :

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

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

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