



**YENEPOYA UNIVERSITY**

**Deralakatte, Mangaluru - 575018**

**REGULATIONS AND CURRICULUM GOVERNING  
UNDERGRADUATE PROGRAM  
B.Sc ANAESTHESIA AND OT TECHNOLOGY**

**(CURRICULUM - EFFECTIVE FROM 2015-16)**

**ATTESTED**  
  
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No.YU/REG/ACA/Academic Council-18/2014

18.10.2014

**NOTIFICATION**

Sub: Starting of B.Sc. course in Anaesthesia & O.T. Technology from the Academic year 2015-16 under the Faculty of Allied Health & Basic Sciences

Ref: 18<sup>th</sup> meeting of the Academic Council held on 08.10.2014 (Agenda-16)

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The Academic Council at its meeting held on 08.10.2014 (vide Agenda - 16) and subsequently the Board of Management have approved the proposal to start 3 year + 6 months internship B.Sc. course (Anaesthesia and O.T. Technology) as proposed by the Board of Studies concerned and recommended by the Faculty of Allied Health & Basic Sciences. The Regulations/Syllabus recommended by the Faculty of Allied Health & Basic Sciences has also been approved by the Academic Council.

The course shall start from the academic year 2015-16 under the Department of Anaesthesia.

  
**REGISTRAR**

Copy to:

1. The Principal, YMC
2. Dean, Faculty of Allied Health & Basic Sciences
3. HoD, Anaesthesia
4. Controller of Examinations
5. Academic Section - to write to Govt. of Karnataka & UGC in the matter

# B.Sc ANAESTHESIA AND OT TECHNOLOGY

**Objective:** To produce skilled technologist with a strong scientific foundation who has knowledge, confidence, values and skills to perform and assist diagnostic and therapeutic services in his specialty

## REGULATIONS

### 1. Name of the course:

B Sc. Anaesthesia and Operation Theatre Technology.

### 2. Eligibility for admission:

A candidate seeking admission to the Bachelor of Science Degree in Anaesthesia & O.T. Technology shall have studied English as one of the principal subjects during the tenure of the course and shall have passed:

a) Two year Pre-University examination or equivalent as recognized by Yenepoya University, with Physics, Chemistry and Biology as principal subjects of study.

OR

b) Pre-degree course from a recognized university considered as equivalent by Yenepoya University, (two years after ten years of schooling) with Physics, Chemistry and Biology as principal subjects of study.

OR

c) Any equivalent examination recognized by the Yenepoya University for the above purpose, with Physics, Chemistry and Biology as principal subjects of study.

OR

d) Vocational higher secondary education course conducted by Vocational Higher Secondary Education, with five subjects including Physics, Chemistry, Biology and English in addition to vocational subjects conducted, is considered equivalent to 'plus – two' [10+2] examinations of Government of Karnataka Pre University Course.

OR

e) Candidates with two years diploma from a recognized Government Board in Anaesthesia or O.T Technology or Combined course of Anaesthesia & O.T. Technology shall have passed 'plus – two' [10+2] with Physics, Chemistry and Biology, as principle subjects OR candidates with 3 years diploma from a recognized Government Board in Anaesthesia or O.T Technology or Anaesthesia & O.T. Technology should have studied Physics, Chemistry and Biology as principal subjects during the tenure of the course.

**3. Duration of the course:**

Duration shall be for a period of three years followed by six months of internship.

**4. Medium of instruction:**

The medium of instruction and examination shall be in English.

**5. Attendance:**

Candidates should have attended at least 75% 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 the University, in each of the subjects prescribed for that year, separately theory and practical, to be eligible to appear for the university examinations. Candidates lacking in prescribed percentage of attendance in any subject, either in theory or practical, in the first appearance, will not be eligible to appear for the university examination in that subject, unless they put in the required attendance, to appear in the subsequent examinations.

**6. Internal assessment (IA):**

There shall be a minimum of three periodical tests in theory and practical of each subject spread over evenly in an academic year. The average marks of the best two tests will be calculated and after reducing the marks suitably as specified under IA in table IV, V & VI, taken as IA in that subject. 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. Candidates have to secure 35% marks in the IA in each subject to become eligible to appear in the university examination. The marks of the internal assessment must be displayed on the notice board of the respective colleges within a fortnight from the date test is held. If a candidate is absent for any of the tests due to genuine and satisfactory reasons, such a candidate may be given a re-test, within a fortnight of the test.

**7. Subject and hours of teaching for theory and practical:**

The number of hours of teaching theory and practical, subject wise in first year, second year and third year are shown in table I, table II and table III. Main and subsidiary subjects are common in first year for all the courses in Allied Health Sciences.

**Table I: Distribution of teaching hours in first year subjects.**

<b>Sl No</b>	<b>Subject</b>	<b>Theory No. of hours</b>	<b>Practical No. of hours</b>	<b>Total no. of hours</b>
<b>A</b>	<b>Main subjects</b>			
1	Human anatomy	70	20	90
2	Physiology	70	20	90
3	Biochemistry-I	70	20	90
4	Pathology-I	70	20	90
5	Microbiology-I	70	20	90
	<b>Total</b>	<b>350</b>	<b>100</b>	<b>450</b>
<b>B</b>	<b>Subsidiary subjects</b>			
1	English	25		
2	Kannada	25		
3	Health-care	40		

**Note:**

a) The classes in main and subsidiary subjects are to be held from Monday to Thursday. On Fridays and Saturdays students shall work in Anaesthesiology Department and operation theatre of the hospital.

b) Hospital Posting: 470 hours

Friday : 8.30 am – 12.30 pm and 2 pm - 4.30 pm

Saturday : 8.30 a.m. to 12.30 p.m. & 1.30 p.m. to 4.30 p.m.

**TABLE II: Distribution of subjects and number of hours of teaching in second year.**

Sl. No.	Subject	Theory No. of Hours	Practical No. of Hours	Clinical posting	Total No. of Hours
A	<b>Main Subjects</b>				
1	Section A: Applied pathology Section B: Applied microbiology	30 30	30 30	--	120
2	Introduction to Anaesthesia related work & operation theatre technology	80	100	650	830
3	Pharmacology	50	--	--	50
4	Medicine relevant to operation theatre technology	50	--	--	50
	<b>Total</b>	<b>240</b>	<b>160</b>	<b>650</b>	<b>1050</b>
B	<b>Subsidiary subjects</b>				
1	Sociology	20			
2	Constitution of India	10			
3	Environmental Science & Health	10			

**Table III: Distribution of Teaching Hours in Third Year Subjects.**

Sl. No.	Subjects	Theory No. of Hours	Practical No. of Hours	Clinical posting	Total No. of Hour
A	<b>Main Subjects</b>				
1	Anaesthesia Management -Clinical & applied	50	50	250	350
2	Operation theatre technology – Clinical & Applied	50	50	250	350
3	Advanced Anaesthesia management	50	150	250	350
	<b>Total</b>	<b>150</b>	<b>150</b>	<b>750</b>	<b>1050</b>
B	<b>Subsidiary subjects</b>				
1	Ethics	20			
2	Research and Biostatistics	10			
3	Computer application	10			

## 8. Schedule of Examination:

- a) The University shall conduct three annual examinations, one at the end of each year, as notified by the university. A candidate who satisfies the requirement of attendance, internal assessment 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. Supplementary examination shall be conducted by the university between 4-6 months from the date of the annual examinations.
- b) Examination for subsidiary subjects shall be conducted by respective college and the results and marks obtained shall be submitted to the University along with the IA marks of main subjects.

## 9. Scheme of Examination:

Distribution of subjects and marks for first year, second year & third year theory and practical examinations are shown in the Table – IV, V & VI.

**Table IV: Distribution of Subjects and marks for First Year theory Examination**

		Written Paper		IA	Total
		Duration	Marks	Marks	Marks
A	<b>Main Subjects</b>				
1	Basic Anatomy (Including Histology)	3 hours	80	20	100
2	Physiology	3 hours	80	20	100
3	Biochemistry-I	3 hours	80	20	100
4	Pathology-I	3 hours	80	20	100
5	Microbiology-I	3 hours	80	20	100
B	<b>Subsidiary Subjects</b>				
1	English	3 hours	80	20	100
2	Kannada	3 hours	80	20	100
3	Health Care	3 hours	80	20	100

### Note:

- a) The university examination for first year shall consist of only theory examination and there shall be no university practical examination.
- b) IA=Internal Assessment
- c) Main subjects shall have University examination.
- d) Examination for subsidiary subjects shall be conducted by respective college.

**TABLE V: Distribution of subjects and marks for Second year examination.**

Paper	Subjects	Theory				Practical			Grand Total
		Theory	Viva Voce	IA	Sub Total	Practical's	IA	Sub Total	
<b>A</b>	<b>Main Subjects</b>								
1	SectionA: Applied pathology SectionB: Applied microbiology	50 50	30	20	150	40	10	50	200
2	Introduction to Anaesthesia & operation theatre technology	100	30	20	150	40	10	50	200
3	Pharmacology	80	--	20	100	No practical			100
4	Medicine relevant to operation theatre technology	80	--	20	100	No practical			100
<b>B</b>	<b>Subsidiary Subjects</b>	<b>Duration</b>	<b>Marks</b>	<b>IA Theory Marks</b>	<b>Total Marks</b>				
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				

Note: Examination for subsidiary subjects shall be conducted by respective college.



**TABLE VI: Distribution of subjects and marks for Third year examination.**

Paper	Subjects	Theory				Practical			Grand Total
		Theory	Viva Voce	IA	Sub Total	Practicals	IA	Sub Total	
<b>A</b>	<b>Main Subjects</b>								
1	Clinical Anaesthesia and O.T. Technology	100	30	20	150	120 (40+40+40)	30 (10+10+10)	150	600
2	Applied Anaesthesia and O.T. Technology	100	30	20	150				
3	Advanced Anaesthesia Management	100	30	20	150				
<b>B</b>	<b>Subsidiary Subjects</b>	<b>Duration</b>		<b>Marks</b>		<b>IA</b>	<b>Total Marks</b>		
1	Ethics	3 hours		80		20	100		
2	Research & Biostatistics	3 hours		80		20	100		
3	Computer application	3 hours		80		20	100		

**Note:**

- Practical - One common practical for all the three papers with equal weightage of marks i.e. 40 practical marks and 10 IA marks each paper.
- Examination for subsidiary subjects shall be conducted by respective college.

**10. Question Paper pattern:**

For 100 marks question paper

Type of Questions	No of Questions	Marks For Each	Total
Essay type	3 (2x10)	10	20
Short essay type	12 (10x5)	05	50
Short answer type	12 (10x3)	03	30

For 80 marks question paper

Type of Questions	No of Questions	Marks For Each	Total
Long Essay	3 (2x10)	10	20
Short Essay	8 (6x5)	05	30
Short Answers	12 (10x3)	03	30

For 50 marks question paper

Type of Questions	No of Questions	Marks For Each	Total
Long Essay	3 (2X10)	10	20
Short Essay	5 (3X5)	5	15
Short Answers	7 (5X3)	3	15

### 11. Practical Examination.

- a) There shall be no University practical examination in the first year.
- b) Practical Examination (2<sup>nd</sup> Year):
  - i) There will be a combined practical examination for Applied Pathology & Applied Microbiology (20 marks each).

#### Pathology

SI No	Tests	Marks
1	Interpretation of hematology chart	05
2	Interpretation of urine chart	05
3	Estimation of hemoglobin	05
4	Estimation of bleeding time & clotting time	05
	<b>Total</b>	<b>20</b>

#### Microbiology

SI 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/deionized water, based on growth of colonies in BHI Agar to be reported as X CFU/ unit	05
	<b>Total</b>	<b>20</b>

- ii) There shall be no University practical examination in Applied Pharmacology and Medicine Relevant to Anaesthesia and O.T. Technology.
- c) Practical Examination (3<sup>rd</sup>. Year)  
One common practical for all the three papers with equal weightage of marks i.e. 40 marks for each paper.

## 12. Board of Examiners:

Practical examination will be conducted by two examiners out of which one will be external examiner recognized by the university.

## 13. Criteria for pass:

- a) Main Subjects: Candidates are declared to have passed in a subject, if they secure 40% of marks in university examination and internal assessment added together. Theory & practical shall be considered to be separate subjects. If a candidate passes in practical examination but fails in one or more theory papers, such candidate is exempted from reappearing for practical but shall have to appear in the subsequent examination for the theory paper in which the candidate has failed OR vice versa.
- 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.

## 14. Declaration of class:

- a) A candidate who passes all the main subjects in the first attempt, securing 75% marks (aggregate), shall be declared to have passed the examination with **Distinction**.
- b) A candidate who passes all the main subjects in the first attempt, securing 60% marks or more, but less than 75% (aggregate), shall be declared to have passed the examination with **First Class**.
- c) A candidate who passes all the main subjects in the first attempt, securing 50% marks or more, but less than 60% (aggregate), shall be declared to have passed the examination with **Second Class**.

- d) A candidate who passes all the main subjects in the first attempt, securing 40% marks or more, but less than 50% (aggregate), shall be declared to have passed the examination with **Pass Class**.
- e) A candidate passing university examination in more than one attempt shall be placed in **Pass class** irrespective of the percentage of marks secured.
- f) Marks obtained in the subsidiary subjects shall have no bearing on the class declaration.

### **15. Carry over**

A candidate who fails in main subjects and /or subsidiary subjects of first year and/ or second year shall be permitted to carry over those subjects up to final year. However, the candidate must pass the carry over subjects before appearing for third year university examination.

### **16. Internship**

Six months internship shall be mandatory after successful completion of third year examination. The respective department shall issue 'Internship Completion Certificate'

### **17. Award of degree**

A candidate who has passed in all the main and subsidiary subjects of first, second and third year and has successfully completed the internship shall be eligible for award of degree.

### **18. Maximum duration for completion of course**

A candidate shall complete the course within six years from date of admission, failing which re registration shall be mandatory.

**SYLLABUS**  
**First Year B.Sc. Anaesthesia and Operation Theatre Technology**

**ANATOMY**

No. of Theory classes: 70 hours

No. of Practical classes: 20 hours

**1. Introduction: Human body as a whole**

**a) Theory:**

Definition of anatomy and its divisions. Terms of location, positions and planes.

Cell and its organelles.

Epithelium: definition, classification, describe with examples, function.

Glands: classification, describe serous & mucous glands with examples.

Basic tissues: classification with examples

**b) Practical:**

Histology of types of epithelium.

Histology of serous, mucous & mixed salivary gland.

**2. Locomotion and support**

**a) Theory:**

Cartilage: types with example & histology.

Bone: classification, names of bone cells, parts of long bone, microscopy of compact bone, names of all bones, vertebral column, inter-vertebral 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.

**b) Practical:**

Histology of the 3 types of cartilage.

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

Histology of compact bone (TS & LS).

Demonstration of all muscles of the body.

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

**3. Cardiovascular system**

**a) Theory:**

Heart: size, location, chambers, exterior & interior, blood supply of heart.

Systemic & pulmonary circulation, branches of aorta, common carotid artery, subclavian artery, axillary artery, brachial artery, superficial palmar arch, femoral artery, internal iliac artery, peripheral pulse, inferior vena cava, portal vein, porto-

systemic 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.

**b) Practical:**

Demonstration of heart and vessels in the body.  
Histology of large artery, medium sized artery & vein, large vein.  
Histology of lymph node, spleen, tonsil & thymus.  
Normal chest radiograph showing heart shadows.  
Normal angiograms.

**4. Gastro-intestinal system**

**a) Theory:**

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

**b) Practical:**

Demonstration of parts of gastro intestinal system.  
Normal radiographs of gastro intestinal system.  
Histology of gastro intestinal system.

**5. Respiratory system**

**a) Theory:**

Parts of RS, nose, nasal cavity, larynx, trachea, lungs, Broncho-pulmonary segments, histology of trachea, lung and pleura, names of paranasal air sinuses.

**b) Practical:**

Demonstration of parts of respiratory system.  
Normal radiographs of chest.  
Histology of lung and trachea.

**6. Peritoneum**

**a) Theory:**

Description in brief.

**b) Practical:**

Demonstration of reflections.

**7. Urinary system**

**a) Theory:**

Kidney, ureter, urinary bladder, male and female urethra.  
Histology of kidney, ureter and urinary bladder.

**b) Practical:**

Demonstration of parts of urinary system.  
Histology of kidney, ureter, urinary bladder.

Radiographs of abdomen-IVP, retrograde cystogram.

## **8. Reproductive system**

### **a) 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.

### **b) Practical:**

Demonstration of section of male and female pelvis with organs in situ.

Histology of testis, vas deferens, epididymis, prostate, uterus, fallopian tube, ovary. Radiographs of pelvis, hystero-salpingogram.

## **9. Endocrine glands**

### **a) Theory:**

Endocrine glands: pituitary gland, thyroid gland, parathyroid gland, suprarenal gland (gross & histology).

### **b) Practical:**

Demonstration of the glands.

Histology of pituitary, thyroid, parathyroid, suprarenal glands.

## **10. Nervous system**

### **a) Theory:**

Neuron, classification of nervous system, 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.

### **b) Practical:**

Histology of peripheral nerve & optic nerve.

Demonstration of all plexuses and nerves in the body.

Demonstration of all parts of brain.

Histology of cerebrum, cerebellum, spinal cord.

## **11. Sensory organs:**

### **a) Theory:**

Skin: histology, appendages of skin.

Eye: parts of eye & lacrimal apparatus. Extra-ocular muscles & nerve supply. Parts of ear: external, middle and inner ear and contents.

### **b) Practical:**

Histology of thin and thick skin.

Demonstration and histology of eyeball.

Histology of cornea & retina.

## **12. Embryology:**

### **a) Theory:**

Spermatogenesis & oogenesis.

Ovulation, fertilization.

Fetal circulation. Placenta.

### **b) Practical:**

Demonstration of models.

## **REFERENCE BOOKS**

1. Chourasia: A Text book of Anatomy
2. T.S. Ranganathan: A text book of Human Anatomy
3. Fattana: Human anatomy (Description and applied) Saunder's & C P Prism Publishers, Bangalore – 1991
4. Bhatnagar: Essentials of Human embryology. Revised Edition Orient Blackswan Pvt. Ltd.



# PHYSIOLOGY

No. of Theory classes: 70 hours

No. of Practical classes: 20 hours

## Theory

### 1. Blood

Introduction: composition and function of blood.

Red blood cells: erythropoiesis, stages of differentiation, function, count, physiological variation.

Structure, function, concentration, physiological variation, methods of estimation of haemoglobin.

White blood cells: production, function, life span, count, differential count. Platelets: origin, normal count, morphology functions.

Plasma proteins: production, concentration, types, functions, albumin, globulin, fibrinogen, prothrombin.

Haemostasis: definition, normal haemostasis, clotting factors, mechanism of clotting, disorders of clotting factors.

Blood bank:

Blood groups: ABO system, Rh system. Blood grouping & typing, cross matching. Rh system: Rh factor, Rh incompatibility.

Blood transfusion: indication, universal donor and recipient concept. Selection criteria of a blood donor, transfusion reactions. Anticoagulants: classification, examples and uses.

Anaemias: morphological and etiological classification, effects of anemia on body.

Blood indices: colour index, MCH, MCV, MCHC.

Erythrocyte sedimentation rate (ESR) and packed cell volume, normal values, definition, determination.

Blood volume: normal value, determination of blood volume and regulation of blood volume.

Body fluid: pH, normal value, regulation and variation.

Lymph: lymphoid tissue formation, circulation, composition and function of lymph.

### 2. Cardiovascular system

Heart: physiological anatomy, nerve supply.

Properties of cardiac muscle, cardiac cycle: systole, diastole. Intra-ventricular pressure curves.

Cardiac output (only definition).

Heart sounds, normal heart sounds, areas of auscultation.

Blood pressure: definition, normal value, clinical measurement of blood pressure.

Physiological variations, regulation of heart rate, cardiac shock, hypotension, hypertension. Pulse: jugular, radial pulse, triple response.

Heart sounds: normal heart sounds, causes, characteristics and significance, heart rate.

Electrocardiogram (ECG) significance.

### **3. Digestive System**

Physiological anatomy of gastro intestinal tract, functions of digestive system.

Salivary glands: structure and functions, deglutition: stages and regulation. Stomach: structure and functions.

Gastric secretion: composition function regulation of gastric juice secretion.

Pancreas: structure, function, composition, regulation of pancreatic juice.

Functions of liver. Bile secretion, composition, function, regulation of bile secretion, bilirubin metabolism, types of bilirubin, Vandenberg reaction, jaundice: types, significance.

Functions of gall bladder.

Small intestine: functions, digestion, absorption, movements.

Large intestine: functions, digestion and absorption of carbohydrates, proteins, fats, lipids, defecation

### **4. Respiratory system**

Functions of respiratory system, physiological anatomy of respiratory system, respiratory tract, respiratory muscles.

Respiratory organs: lungs, alveoli, respiratory membrane, stages of respiration.

Mechanism of normal and rigorous respiration, forces opposing and favoring expansion of the lungs. Intra pulmonary pleural pressure, surface tension, recoil tendency of the wall. Transportation of respiratory gases: transportation of oxygen: direction, pressure gradient, forms of transportation, oxygenation of Hb. Quantity of oxygen transported. Lung volumes and capacities

Regulation of respiration: mechanisms of regulation, nervous and chemical regulation, respiratory centre, Herring Breur reflexes.

Applied physiology and respiration: hypoxia, cyanosis, asphyxia, dyspnea, dysbarism, Artificial respiration, apnoea.

### **5. Endocrine System**

Definition, classification of endocrine glands & their hormones, properties of hormones. Thyroid gland hormone: physiological anatomy, hormone secreted, physiological function, regulation of secretion, disorders: hypo and hyper secretion of hormone.

Adrenal cortex: physiological anatomy of adrenal gland, adrenal cortex, cortical hormones, functions and regulation.

Adrenal medulla: hormones, regulation and secretion. Functions of adrenaline and nor adrenaline.

Pituitary hormones: anterior and posterior pituitary hormones, secretion, function.  
Hormones of pancreas.  
Insulin: secretion, regulation, function and action.  
Diabetes mellitus: regulation of blood glucose level.  
Parathyroid gland: function, action, regulation of secretion of parathyroid hormone. Calcitonin: function and action.

## 6. Special senses

Vision: structure of eye, function of different parts.  
Structure of retina.  
Hearing: structure and function of ear, mechanism of hearing.  
Taste buds: functions.  
Smell: physiology, receptors.

## 7. Nervous system

Functions of nervous system, neuron: structure, classification and properties.  
Neuroglia, nerve fiber, classification, conduction of impulses continuous and saltatory. Velocity of impulse transmission and factors affecting.  
Synapse: structure, types, properties. Receptors: definition, classification, properties.  
Reflex action: unconditioned properties of reflex action. Babinski's sign.  
Spinal cord nerve tracts. Ascending tracts, descending tracts.

- **Pyramidal tracts**

Extrapyramidal tracts, functions of medulla, pons, hypothalamic disorders.  
Cerebral cortex lobes and functions, sensory cortex, motor cortex, cerebellum, functions of cerebellum. Basal ganglion: functions. EEG.  
Cerebro Spinal Fluid (CSF): formation, circulation, properties, composition and functions.  
Lumbar puncture.

- **Autonomic Nervous System:**

Sympathetic and parasympathetic distribution and functions and comparison of functions.

## 8. Excretory System

Functions of kidneys, nephron, vasa recta, cortical and juxtamedullary nephrons, comparison, juxta glomerular apparatus: structure and function.  
Renal circulation peculiarities.  
Mechanism of urine formation: ultrafiltration criteria for filtration GFR, plasma fraction, GFR, factors effecting GFR. Determination of GFR selective reabsorption – sites of reabsorption, substance reabsorbed, mechanisms of reabsorption of glucose, urea,  $H^+$ ,  $Cl^-$  aminoacids etc. TMG, tubular load, renal threshold % of reabsorption of different substances, selective secretion.

Properties and composition of normal urine, urine output. Abnormal constituents in urine, mechanism of urine concentration. Counter-current mechanisms : micturition, innervation of bladder, cystourethrogram.

Diuretics : water, diuretics, osmotic diuretics, artificial kidney, renal function tests: plasma clearance, actions of ADH, aldosterone and PTH on kidneys.

Renal function tests.

## **9. Reproductive system**

Function of reproductive system, puberty.

Male reproductive system: functions of testes, spermatogenesis: site, stages, factors influencing, semen. Endocrine functions of testes.

Androgens: testosterone structure and functions.

Female reproductive system: ovulation, menstrual cycle: physiological changes during pregnancy, pregnancy test.

Lactation: composition of milk, factors controlling lactation.

## **10. Muscle nerve physiology**

Classification of muscle, structure of skeletal muscle, sarcomere contractile proteins, Neuromuscular junction. Transmission across neuromuscular junction. Excitation contraction coupling. Mechanism of muscle contraction muscle tone, fatigue, rigor mortis.

## **11. Skin**

Structure and function, body temperature measurement, physiological variation, regulation of body temperature by physical chemical and nervous mechanisms. Role of hypothalamus, hypothermia and fever.

## **Practicals**

Hemoglobinometry. White blood cell count. Red blood cell count.

Determination of blood groups.

Leishman's staining and differential WBC count. Determination of packed cell Volume. Erythrocyte sedimentation rate (ESR). Calculation of blood indices.

Determination of clotting time, bleeding time. Blood pressure recording.

Auscultation for heart sounds.

Artificial respiration.

Determination of vital capacity.

## **REFERENCE BOOKS**

1. Guyton (Arthur): Text Book of Physiology. Latest Ed. Prism publishers.
2. Chatterjee CC: Human Physiology Latest Ed. Vol-1, Medical Allied Agency.
3. Choudhari Sujith K: Concise Medical Physiology Latest Ed. New Central Book.
4. Ganong William F: Review of Medical Physiology. Latest Ed. Tata McGraw Hill.

# BIOCHEMISTRY

No. Theory classes: 70 hours

No. of Practical classes: 20 hours

## Theory:

### 1. Specimen collection:

Pre-analytical variables.

Collection of blood.

Collection of CSF & other fluids. Urine collection.

Use of preservatives.

Anticoagulants.

### 2. Introduction to laboratory apparatus

Pipettes: different types (graduated, volumetric, Pasteur, automatic etc.).

Calibration of glass pipettes.

Burettes, beakers, petri dishes, depression plates.

Flasks: different types (volumetric, round bottomed, Erle Meyer conical etc.). Funnels: different types (conical, Buchner etc.).

Bottles: reagent bottles – graduated and common, wash bottles – different type specimen bottles

### 3. Measuring cylinders, porcelain dish

Tubes: test tubes, centrifuge tubes, test tube draining rack. Tripod stand, wire gauze, bunsen burner.

Cuvettes, significance of cuvettes in colorimeter, cuvettes for visible and UV range. Cuvette holder racks: bottle, test tube, pipette, dessicator, stop watch, timers, scissors.

Dispensers: reagent and sample.

Maintenance of lab glass ware and apparatus. Glass and plastic ware in laboratory.

Use of glass: significance of boro silicate glass, care and cleaning of glass ware, different cleaning solutions of glass.

Care and cleaning of plastic ware, different cleaning solution.

### 4. Instruments (Theory and demonstration) Diagrams to be drawn

Use, care and maintenance of: water bath, oven & incubators, water distillation plant, water de ionisers, refrigerators, cold box, deep freezers, reflux condenser, centrifuge, balances, colorimeter, spectrophotometer, pH meter and electrodes.

Centrifuges: definition, principles, Svedberg unit, centrifugal force, centrifugal field,

RPM, conversion of G to RPM and vice versa, different types of centrifuges.  
Manual balances: single pan, double pan, triple balance, direct read out electrical balances. Guideline to be followed and precautions to be taken while weighing.  
Weighing different types of chemicals, liquids, hygroscopic compounds etc.  
Colorimeter, spectrophotometer, pH meter, electrodes, salt bridge solution: principles, parts, types, guidelines to be followed and precautions to be taken while using.

## **5. Safety of measurements**

## **6. Conventional and SI units**

## **7. Atomic structure**

Dalton's theory, properties of electrons, protons, neutrons, and nucleus, Rutherford's model of atomic structure, Bohr's model of atomic structure, orbit and orbital quantum numbers, Heisenberg's uncertainty principle. Electronic configuration, Aufbau principle, Pauli's exclusion principle, etc.

Valency and bonds: different types of strong and weak bonds in detail with examples.

Theory & Practicals for all the following under this section: molecular weight, equivalent weight of elements and compounds, normality, molarity. Preparation of molar solutions (mole/litre solution) eg: 1 M NaCl, 0.15 M NaCl, 1 M NaOH, 0.1 M HCl, 0.1 M H<sub>2</sub>SO<sub>4</sub> etc. Preparation of normal solutions. eg, 1N Na<sub>2</sub>CO<sub>3</sub>, 0.1N Oxalic acid, 0.1 N HCl, 0.1N H<sub>2</sub>SO<sub>4</sub>, 0.66 N H<sub>2</sub>SO<sub>4</sub> etc., percent solutions. Preparation of different solutions: v/v w/v (solids, liquids and acids). Conversion of a percent solution into a molar solution.

## **8. Dilutions**

Diluting solutions: e.g. preparation of 0.1 N NaCl from 1 N NaCl & from 2N NaCl etc, preparing working standard from stock standard, body fluid dilutions, reagent dilution techniques, calculating the dilution of a solution, body fluid reagent etc, saturated and supersaturated solutions. Technique for preparation of standard solutions eg: glucose, urea, etc, significance of volumetric flask in preparing standard solutions. Volumetric flasks of different sizes, preparation of standard solutions of deliquescent compounds (CaCl<sub>2</sub>, potassium carbonate, sodium hydroxide etc). Preparation of standards using conventional and SI units acids, bases, salts and indicators.

## 9. Acids and Bases

Definition, physical and chemical properties with examples. Arrhenius concept of acids and bases, Lowery – Bronsted theory of acids and bases. Classification of acids and bases. Differences between bases and alkali, acidity and basicity, monoprotic and polyprotic acids and bases. Concepts of acid base reaction, hydrogen ion concentration, ionisation of water, buffer, pH value of a solution.

Preparation of buffer solutions using pH meter. Salts: definition, classification, water of crystallization, definition and different types, deliquescent and hygroscopic salts.

## 10. Acid- base indicators: (Theory and Practicals)

### Theory

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

### Practicals

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

## 11. Quality control

Accuracy, precision. Specificity, sensitivity, limits of error allowable in laboratory, percentage error.

Normal values and Interpretations.

## 12. Special Investigations

Serum electrophoresis, immunoglobulins, drugs: digitoxin, theophylline, regulation of acid base status, Henderson Hassel Bach equations, buffers of the fluid, pH regulation, disturbance in acid base balance, anion gap, metabolic acidosis, metabolic alkalosis, respiratory acidosis, respiratory alkalosis, basic principles and estimation of blood gases and pH, basic principles and estimation of electrolytes, water balance, sodium regulation, bicarbonate buffers, nutrition, nutritional support with special emphasis on parental nutrition, calorific value, nitrogen balance, respiratory quotient, basal metabolic rate, dietary fibers, nutritional importance of lipids, carbohydrates and proteins, vitamins.



## **PRACTICALS**

Analysis of normal urine.  
Composition of urine.  
Procedure for routine screening.  
Urinary screening for inborn errors of metabolism.  
Common renal disease.  
Urinary calculus.  
Urine examination for detection of abnormal constituents.  
Interpretation and diagnosis through charts.  
Liver function tests.  
Lipid profile.  
Renal function test.  
Cardiac markers.  
Blood gas and electrolytes.  
Estimation of blood sugar, blood urea and electrolytes.  
Demonstration of strips, demonstration of glucometer.

## **REFERENCE BOOKS**

1. Varley: Clinical chemistry
2. Kaplan: Clinical chemistry
3. Vasudevan DM, Sreekumari, S: Text book of Biochemistry for Medical students, Latest Ed
4. Das, Debajyothi): Biochemistry, Latest ED, Academic, Publishers, Calcutta – 1992
5. Rajagopal: Practical Biochemistry for Medical students-, Orient Longman Pvt Ltd.

# PATHOLOGY

No. Theory classes: 70 hours

No. of Practical classes: 20 hours

## **Theory**

### **1. Histopathology**

Introduction to histopathology

Receiving of specimen in the laboratory. Grossing techniques

Mounting techniques: various mountants

Maintenance of records and filling of the slides.

Use and care of microscope

Various fixatives, mode of action, preparation and indication, section cutting.

Tissue processing for routine paraffin sections. Decalcification of tissues.

Staining of tissues: H & E staining

Bio- medical waste management

### **2. Clinical pathology**

Introduction to clinical pathology

Collection, transport, preservation, and processing of various clinical specimens

Urine examination: collection and preservation of urine, physical, chemical, microscopic examination.

Examination of body fluids

Examination of body fluids

Examination of cerebrospinal fluid (CSF)

Sputum examination

Examination of faces

### **3. Hematology**

Introduction to hematology

Normal constituents of blood, their structure and function

Collection of blood samples

Anticoagulants used in hematology

Instruments and glassware used in hematology, preparation and use of glassware.

Laboratory safety guidelines

SI units and conventional units in hospital, laboratory.

Hb, PCV, ESR

Normal Hemostasis

Bleeding time, clotting time, prothrombin time, activated partial thromboplastin time

#### **4.Blood bank**

Introduction

Blood grouping and Rh types, cross matching

#### **PRACTICALS**

Urine Examination: physical, chemical, microscopic

Blood grouping Rh typing

Hb estimation, Packed Cell Volume (PCV), Erythrocyte Sedimentation Rate (ESR), Bleeding time, clotting time

Histopathology: section cutting and H & E staining

#### **REFERENCE BOOKS**

1. Bancroft: Histopathology techniques
2. Todd & Sanford: Clinical Diagnosis by laboratory method
3. Ramanic Sood: Laboratory Technology (Methods and interpretation) 4<sup>th</sup> Ed.J.P.Bros, NewDelhi-1996.
4. SachdevK.N.: Clinical Pathology and Bacteriology 8<sup>th</sup> Ed,J.P.Bros, NewDelhi-1991.
5. Krishna: Textbook of Pathology, Orient Longman PVT Ltd.NewDelhi-1991.

# MICROBIOLOGY

No. Theory classes: 70 hours

No. of Practical classes: 20 hours

## Theory

- 1. Morphology** **4hours**  
Classification of microorganisms, size, shape and structure of bacteria. Use of microscope in the study of bacteria.
- 2. Growth and nutrition** **3 hours**  
Nutrition, growth and multiplications of bacteria, use of culture media in diagnostic bacteriology.
- 3. Culture media**  
Use of culture media in diagnostic bacteriology, anti-microbial sensitivity test. **1 hour**
- 4. Sterilization and Disinfection** **4 hours**  
Principles and use of equipment's of sterilization namely hot air oven, autoclave and serum inspissator, pasteurization, antiseptic and disinfectants.
- 5. Immunology** **6 hours**  
Immunity, vaccines, types of vaccine and immunization schedule, principles and interpretation of common serological tests namely Widal, VDRL, ASLO, CRP, RF & ELISA. Rapid tests for HIV and HBsAg (excluding technical details).
- 6. Systematic Bacteriology** **20 hours**  
Morphology, cultivation, diseases caused, laboratory diagnosis including specimen collection of the following bacteria (excluding classification, antigenic structure and pathogenicity), Staphylococci, Streptococci, Pneumococci, Gonococci, Meningococci, C. diphtheriae, Mycobacteria, Clostridia, Bacillus, Shigella, Salmonella, Sech coli, Klebsiella, Proteus, Vibrio cholerae, Pseudomonas & Spirochetes.
- 7. Parasitology** **10 hours**  
Morphology, life cycle, laboratory diagnosis of following parasites: E. histolytica, Plasmodium, tape worms, Intestinal nematodes.
- 8. Mycology** **4 hours**  
Morphology, diseases caused and lab diagnosis of following fungi. Candida, Cryptococcus, Dermatophytes, opportunistic fungi

- 9. Virology** **10 hours**  
 General properties of viruses, diseases caused lab diagnosis and prevention of following viruses, Herpes, Hepatitis, HIV, Rabies and Poliomyelitis.
- 10. Hospital infection** **4 hours**  
 Causative agents, transmission methods, investigation, prevention and control of hospital infection.
- 11. Principles and practice Biomedical waste management** **4 hours**  
**Practical** **20 hours**

Compound microscope.

Demonstration of sterilization equipment's: hot air oven, autoclave, bacterial filters. Demonstration of commonly used culture media, nutrient broth, nutrient agar, blood agar, chocolate agar, Mac conkey medium, L J media, Robertson cooked meat media, Potassium tellurite media with growth, Mac with LF & NLF, NA with staph.

Antibiotic susceptibility test.

Demonstration of common serological tests: Widal, VDRL, ELISA. Grams staining.

Acid fast staining.

Stool exam for helminthic ova & cysts.

Visit to hospital for demonstration of biomedical waste management.

Anaerobic culture methods.

## **REFERENCE BOOKS**

1. Anathanarayana & Panikar: Medical Microbiology – Latest Edition University Press.
2. Robert Cruickshank: Medical Microbiology – The Practice of Medical Microbiology.
3. Basic Laboratory methods in Parasitology: 1st Ed, J P Bros, New Delhi.
4. Basic laboratory procedures in clinical bacteriology, 1st Ed, J P Brothers, New Delhi.
5. Ajit Damle: Medical Parasitology.

## SUBSIDIARY SUBJECTS

### First Year B.Sc. Anaesthesia and Operation Theatre Technology

#### ENGLISH

**Teaching Hours: 20**

#### 1. 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.

#### 2. Behavioral objectives

The student at the end of training shall be able to:

- a) Read and comprehend English language.
- b) Speak and write grammatically correct English.
- c) Appreciate the value of English literature in personal and professional life.

#### 3. Contents

##### **Unit - I: Introduction:**

- a) Study techniques.
- b) Organization of effective note taking and logical processes of analysis and synthesis.
- c) Use of the dictionary.
- d) Enlargement of vocabulary.
- e) Effective diction.

##### **Unit - II: Applied grammar:**

- a) Correct usage.
- b) The structure of sentences.
- c) The structure of paragraphs.
- d) Enlargements of vocabulary.

**Unit - III: Written composition:**

- a) Precise writing and summarizing.
- b) Writing of bibliography.
- c) Enlargement of vocabulary.

**Unit - IV: Reading and comprehension:**

- a) Review of selected materials and express oneself in one's words.
- b) Enlargement of vocabulary.

**Unit - V: The Study of the various forms of composition:**

- a) Paragraph.
- b) Essay.
- c) Letter.
- d) Summary.
- e) Practice in writing.

**Unit - VI: Verbal communication:**

- a) Discussions and summarization.
- b) Debates.
- c) Oral reports.
- d) Use in teaching.

**REFERENCE**

1. English Grammar: Collins, Birmingham University, International Language DataBase, Rupa & Co. 1993.
2. Wren and Martin: Grammar and Composition, 1989, Chand & Co, Delhi.
3. Spoken English: V. Shasikumar and P V Dhanija. Pub. By: Tata Mcgraw Hill, NewDelhi
4. Writers Basic Book self-Series: Writers Digest series.

## ಕನ್ನಡ : ಒಂದು

### ಪಠ್ಯ ಕ್ರಮದ ರೂಪರೇಖೆ

- ಸ್ಥಾನ : ಬಿ.ಎಸ್.ಸಿ. (ಅಲೈಡ್ ಹೆಲ್ತ್ ಸೈನ್ಸ್ ಕೋರ್ಸ್) ಮೊದಲ ವರ್ಷ  
ಸಮಯ : ೨೫ ಘಂಟೆಗಳು (ಇಪ್ಪತ್ತೈದು ಘಂಟೆಗಳು)  
ಪಠ್ಯಕ್ರಮದ ವಿವರಣೆ : ವಿದ್ಯಾರ್ಥಿ / ವಿದ್ಯಾರ್ಥಿನಿಯರು ದಿನ ನಿತ್ಯ ಸಂಪರ್ಕಿಸಬಹುದಾದ ಜನಸಾಮಾನ್ಯರೊಡನೆ ಶುಶ್ರೂಷೆಗೆ ಸಂಬಂಧಿಸಿದಂತೆ ಕನ್ನಡದಲ್ಲಿ ಸಂಭಾಷಣೆ ಮಾಡಲು ಹಾಗೂ ತಿಳುವಳಿಕೆ ನೀಡಲು ಸಹಕಾರವಾಗುವಂತೆ ಪಠ್ಯಕ್ರಮದ ಮಾದರಿಯನ್ನು ಅಳವಡಿಸುವುದು.  
ಉದ್ದೇಶ : ೧) ದಿನ ಬಳಕೆಯ ವ್ಯವಹಾರದಲ್ಲಿ ಶುಶ್ರೂಷಣೆಗೆ ಸಂಬಂಧಪಟ್ಟಂತೆ ಕನ್ನಡ ಭಾಷೆಗೆ ಅಳವಡಿಕೆ.  
೨) ಕನ್ನಡೇತರರಿಗೆ ಕನ್ನಡ ಭಾಷೆಯ ಪರಿಚಯ ಮಾಡಿಕೊಡುವುದು.

### ಪಠ್ಯಕ್ರಮದ ವಿವರಣೆ

- ಘಟಕ ಒಂದು : ೧) ಅಕ್ಷರಮಾಲೆ, ಸ್ವರಗಳು, ವ್ಯಂಜನಗಳು.  
೨) ಪದ, ಪದಪೂಂಜ, ವಾಕ್ಯರಚನೆ, ಪತ್ರಲೇಖನ, ಪ್ರಬಂಧರಚನೆ.  
ಘಟಕ ಎರಡು : ಶುಶ್ರೂಷಣಾ ಪದಗಳು (ಇಂಗ್ಲಿಷ್‌ನಿಂದ ಕನ್ನಡಕ್ಕೆ ಶುಶ್ರೂಷ ಸಾಮಾನ್ಯ ಬಳಕೆಗೆ ಸಂಬಂಧಪಟ್ಟಂತೆ).  
ಘಟಕ ಮೂರು : ರೋಗಿ ಹಾಗೂ ಶುಶ್ರೂಷಕರ ಮಧ್ಯೆ ಸಾಮಾನ್ಯವಾಗಿ ನಡೆಯುವ ಸಂಭಾಷಣೆ.  
೧) ಪ್ರಶ್ನೆಗಳಿಗೆ ಸಲಹೆ ಕೊಡುವ ವಾಕ್ಯಗಳು.  
೨) ವೈದ್ಯರೊಂದಿಗೆ ಹಾಗೂ ಇತರೆ ಸಹಚರರೊಂದಿಗೆ ವ್ಯವಹರಿಸಲು, ಸಂಭಾಷಣೆ ನಡೆಸಲು ಬೇಕಾದ ವಾಕ್ಯಗಳು.

### ಅಧ್ಯಯನಕ್ಕೆ ಶಿಫಾರಸ್ಸು ಮಾಡಲಾಗಿರುವ ಗ್ರಂಥಗಳು

೧. ಕನ್ನಡ ವ್ಯಾಕರಣ (೮, ೯ ಮತ್ತು ೧೦ನೇ ತರಗತಿಗಳಿಗೆ ಕರ್ನಾಟಕ ಸರ್ಕಾರ, ಪಠ್ಯಪುಸ್ತಕಗಳ ಇಲಾಖೆ)  
೨. ವ್ಯವಹಾರಿಕ ಕನ್ನಡ : ಎಚ್.ಸಿ.ಸಿ.  
೩. ಪತ್ರ ಲೇಖನ : ಕನ್ನಡ ಸಾಹಿತ್ಯ ಪರಿಷತ್ತು  
೪. ಲೇಖನಕಲೆ : ಎನ್. ಪ್ರಹ್ಲಾದ ರಾವ್  
೫. ಆಹಾರ ಮತ್ತು ಇತರೆ ಪ್ರಬಂಧಗಳು : ಡಾ|| ಪಿ ಎಸ್ ಶಂಕರ್  
೬. ವೈದ್ಯ ಪದಗಳ ಹುಟ್ಟು ರಚನೆ : ಡಾ|| ಡಿ ಎಸ್ ಶಿವಪ್ಪ



## HEALTH CARE

**Teaching Hours : 40**

### **1. Introduction to Health**

- a) Definition of health, determinants of health, health indicators of India, health team concept.
- b) National health policy
- c) National health programmes (Briefly objectives and scope)
- d) Population of India and family welfare programme in India

### **2. Introduction to Nursing**

- a) What is nursing? Nursing principles, inter-personnel relationships.
- b) Bandaging: basic turns, bandaging extremities, triangular bandages and their application.
- c) Nursing position, prone, lateral, dorsal, dorsal recumbent, Fowler's positions, comfort measures, bed making, rest and sleep.
- d) Lifting and transporting patients: lifting patients up in the bed, transferring from bed to wheel chair, transferring from bed to stretcher.
- e) Bed side management: giving and taking bed pan, urinal.
- f) Observation of stools, urine, sputum
- g) Use and care of catheters, enema giving.
- h) Methods of giving nourishment: feeding, tube feeding, drips, transfusion.
- i) Care of rubber goods.
- j) Recording of body temperature, respiration and pulse.
- k) Simple aseptic techniques, sterilization and disinfection.
- l) Surgical dressing: observation of dressing procedures.

### **3. First Aid :**

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

## **REFERENCE BOOKS:**

- 1. Preventive and Social Medicine by J.Park

## **Second Year B.Sc. Anaesthesia and Operation Theatre Technology**

### **Applied Pharmacology**

(General concepts about pharmacodynamic and pharmacokinetic principles involved in drug activity).

### **THEORY**

#### **1. Autonomic nerves system.**

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

#### **2. Cardiovascular drugs.**

Mode of action, side effects and therapeutic uses of the following drugs:

- a) Anti hypertensives:
  - I. Beta adrenergic antagonists.
  - ii. Alpha adrenergic antagonists.
  - iii. Peripheral vasodilators.
  - iv. Calcium channel blockers.
- b) Anti arrhythmic drugs.
- c) Cardiac glycosides.
- d) Sympathetic and non-sympathetic inotropic agents.
- e) Coronary vasodilators.
- f) Anti anginal and anti-failure agents.
- g) Lipid lowering & anti atherosclerotic drugs.
- h) Drugs used in hemostasis: anticoagulants thrombolytics and anti-thrombolytics.
- D) Cardioplegic drugs: history, principles and types of cardioplegia.
- j) Primary solutions: history, principles & types.
- k) Drugs used in the treatment of shock.

#### **3. Anaesthetic agents.**

- a) Definition of general and local anaesthetics.
- b) Classification of general anaesthetics.
- c) Pharmacokinetics and pharmacodynamics of inhaled anaesthetic agents.

- d) Intravenous general anaesthetic agents.
- e) Local anaesthetics: classification, mechanism of action, duration of action and methods to prolong the duration of action, preparation, dose and routes of administration.

#### **4. Analgesics**

- a) Definition and classification.
- b) Routes of administration, dose, frequency of administration, side effects and management of non-opioid and opioid analgesics.

#### **5. Antihistamines and antiemetics**

Classification, mechanism of action, adverse effects, preparations, dose and routes and administration.

#### **6. CNS stimulants and depressants**

- a) Alcohol.
- b) Sedatives, hypnotics and narcotics.
- c) CNS stimulants.
- d) Neuromuscular blocking agents and muscle relaxants.

#### **7. Pharmacological protection of organs during CPB**

#### **8. Inhalational gases and emergency drugs.**

#### **9. Pharmacotherapy of respiratory disorders**

- a) Introduction: modulators of bronchial smooth muscle tone and pulmonary vascular smooth muscle tone.
- b) Pharmacotherapy of bronchial asthma.
- c) Pharmacotherapy of cough.
- d) Mucokinetic and mucolytic agents.
- e) Use of bland aerosols in respiratory care.

#### **10. Corticosteroids**

Classification, mechanism of action, adverse effects and complications, preparation, dose and routes of administration.

#### **11. Diuretics**

- a) Renal physiology.
- b) Side of action of diuretics.
- c) Adverse effects.
- d) Preparations, dose and routes of administration.

## **12. Chemotherapy of infections**

- a) Definition.
- b) Classification and mechanism of action of antimicrobial agents.
- c) Combination of antimicrobial agents.
- d) Chemoprophylaxis.
- e) Classification, spectrum of activity, dose, routes of administration and adverse effects of penicillin, cephalosporins, aminoglycosides, tetracyclines, chloramphenicol, antitubercular drugs.

## **13. Miscellaneous.**

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

## **PRACTICALS**

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

## **RECOMENDED BOKS.**

1. R.S.Satoskar, S.D. Bhandarkar, S.S. Aina pure, 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

### THEORY

#### 1. Cardiovascular system

- a) Atherosclerosis: definition, risk factors, briefly pathogenesis & morphology, clinical significance and prevention.
- b) Hypertension: definition, types and briefly pathogenesis and effects of hypertension.
- c) Aneurysms: definition, classification, pathology and complications.
- d) Pathophysiology of heart failure.
- e) Cardiac hypertrophy: causes, pathophysiology & progression to heart failure.
- f) Ischemic heart diseases: definition, types, pathophysiology, pathology & complications of various types of IHD.
- g) Valvular heart diseases: causes, pathology & complication. Complications of artificial valves.
- h) Cardiomyopathy: definition, types, causes and significance.
- i) Pericardial effusion: causes, effects and diagnosis.
- j) Congenital heart diseases: basic defect and effects of important types of congenital heart diseases.

#### 2. Hematology

- a) Anaemia: definition, morphological types and diagnosis of anaemia, brief concept about haemolytic anaemia and polycythaemia.
- b) Leukocyte disorders: leukaemia, leukocytosis, agranulocytosis etc.
- c) Bleeding disorders: definition, classification, causes & effects of important types of bleeding disorders, various laboratory tests used to diagnose bleeding disorders.

#### 3. Respiratory system

- a) Chronic obstructive airway diseases: definition and types, causes, pathology and complications of each type of COPD.
- b) Concept about obstructive versus restrictive pulmonary disease.
- c) Pneumoconiosis: definition, types, pathology and effects.
- d) Pulmonary congestion and edema.
- e) Pleural effusion: causes, effects and diagnosis.

#### **4. Renal system**

- a) Clinical manifestations of renal diseases, causes, mechanism, effects and laboratory diagnosis of ARF & CRF, glomerulonephritis and pyelonephritis.
- b) End stage renal disease: definition, causes, effects and role of dialysis and renal transplantation in its management.
- c) Brief concept about obstructive uropathy.

#### **PRACTICALS**

1. Description & diagnosis of the following gross specimens.

- a) Atherosclerosis.
- b) Aortic aneurysm.
- c) Myocardial infarction.
- 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 of bleeding & clotting time.

## 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 *Clostridium difficile*, 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 measures, occupationally acquired infections in healthcare professionals by respiratory route (tuberculosis, varicella-zoster, respiratory syncytial virus etc), blood borne transmission ( HIV, hepatitis B, hepatitis C, cytomegalovirus, Ebola virus etc), oro fecal route ( salmonella, hepatitis A etc), direct contact ( Herpes simplex virus etc), preventive measures to combat the spread of these infections by monitoring and control. (6hours).
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) Equipment's: classification of the instruments and appropriate methods of sterilization.
  - c) Central supply 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 specimens from outpatient units, inpatient units, minor operation theatre and major operation theatre for sterility testing.
3. The various methods employed for sterility testing.
4. Interpretation of results of sterility testing.
5. Disinfection of wards, OT and laboratory.

## **Medicine Relevant to Operation Theatre Technology**

1. Diabetes mellitus.
2. Hypertension.
3. Ischemic heart disease.
4. Obesity.
5. Elderly patient.
6. Pregnancy.
7. Shock.
8. COPD.
9. Chronic renal failure.
10. Chronic liver disease/failure.
11. Anaemia.
12. Pediatric patient, infant/neonate.
13. Epilepsy.
14. CVA.

## **Introduction to Anaesthesia and Operation Theatre Technology**

1. Introduction to Anaesthesia and Operation Theatre:
2. Importance of Pre Anaesthetic-Evaluation
3. Pre-medication
4. Drugs and equipments for General Anaesthesia
5. Drugs and equipments for Regional Anaesthesia
6. Drugs and equipments for Spinal Anaesthesia
7. Drugs and equipments for Epidural Anaesthesia



8. Recovery room
9. Post-operative Intensive Care
10. Importance of CSSD Department
  - a) Cleaning and dusting: methods of cleaning, composition of dust.
  - b) General care and testing of instruments: forceps, haemostatic, needle holders, knife, blade, scissor, use/ abuse, care during surgery.
  - c) Disinfectants of instruments and sterilization- definition, methods, cleaning agents, detergents, mechanical washing, ultrasonic cleaner, lubrication, inspection and pitfalls
  - d) thermal, hot air oven, dry heat, autoclaving, steam sterilization water etc, UV treatment.
  - e) Various methods of chemical treatment: formalin, glutaraldehyde
  - f) Instrument's etching, care of micro surgical and titanium instruments
  - g) Sterilization of equipments: arthroscope, gastroscope, imago lamp, apparatus, suction apparatus, anaesthetic equipments including endotracheal tubes.
  - h) OT Sterilization including laminar air flow.
  - i) Trouble shooting: colored spots and corrosion, staining, dust deposit, recent amendment in EPA with reference to waste disposal.
11. Blood Transfusion
12. Patient position during Anaesthesia
13. Monitoring in the operation theatre
14. Instrument planning for various surgical procedure and auxiliary instrumentation.
15. OT techniques, OT environment, control of infection scrubbing, theatre cloths including lead apron and goggles.
16. Duties of nurses: ethics, behavior during surgery, etc.

## **SUBSIDIARY SUBJECTS**

### **Second Year B.Sc. Anaesthesia and Operation Theatre Technology**

#### **SOCIOLOGY**

##### **1. Course description**

**Teaching Hours: 20**

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

##### **2. Introduction**

- a) Meaning, definition and scope of sociology.
- b) Its relation to anthropology, psychology, social psychology.
- c) Methods of sociological investigations: case study, social survey, questionnaire, interview and opinion poll methods.
- d) Importance of its study with special reference to health care professionals.

##### **3. Social factors in health and disease**

- a) Meaning of social factors.
- b) Role of social factors in health and disease.

##### **4. Socialization**

- a) Meaning and nature of socialization.
- b) Primary, secondary and anticipatory socialization.
- c) Agencies of socialization.

##### **5. Social groups**

- a) Concepts of social groups influence of formal and informal groups on health and sickness.
- b) The role of primary groups and secondary groups in the hospital and rehabilitation setup.

## **6. Family**

- a) The family, meaning and definitions.
- b) Functions of types of family.
- c) Changing family patterns.
- d) Influence of family on individual's health, family and nutrition.
- e) The effects of sickness in the family
- f) Psychosomatic diseases and their importance.

## **7. Community**

- a) Rural community: meaning and features.
- b) Health hazards of rural communities.
- c) Health hazards of tribal communities.
- d) Urban community: meaning and features.
- e) Health hazards of urban communities.

## **8. Culture and health**

- a) Concept of culture.
- b) Concept of health.
- c) Culture and health.
- d) Culture and health disorders.

## **9. Social change**

- a) Meaning of social changes.
- b) Factors of social changes.
- c) Human adaptation and social change.
- d) Social change and stress.
- e) Social change and deviance.
- f) Social change and health programme.
- g) The role of social planning in the improvement of health and rehabilitation.

## **10. Social problems of disabled**

(Consequences of the following social problems in relation to sickness and disability and remedies to prevent these problems):

- a) Population explosion.
- b) Poverty and unemployment.
- c) Beggary.
- d) Juvenile delinquency.
- e) Prostitution.
- f) Alcoholism.
- g) Problems of women in employment.

**11. Social security**

- a) Social Security and social legislation in relation to the disabled.

**12. Social work**

- a) Meaning of social work.
- b) The role of a medical social worker.

**Reference books**

1. Sachdeva & Vidyabhushan, Introduction to the study of sociology.
2. Indrani T.K., Text book of sociology for graduates' nurses and Physiotherapy students, JP Brothers, New Delhi 10.

## CONSTITUTION OF INDIA

1. **Unit-I:** Meaning of the term 'Constitution'. Making of the Indian Constitution 1946-1950.
2. **Unit-II:** The democratic institutions created by the constitution, Bicameral system of Legislature at the Centre and in the States.
3. **Unit-III:** Fundamental rights and duties their content and significance.
4. **Unit – IV:** Directive principles of States, policies the need to balance fundamental rights with directive principles.
5. **Unit – V:** Special rights created in the Constitution for Dalits, backwards, women and children and the religious and linguistic minorities.
6. **Unit-VI:** Doctrine of Separation of Powers, legislative, executive and judicial and their functioning in India.
7. **Unit – VII:** The Election Commission and State Public Service commissions.
8. **Unit – VIII:** Method of amending the Constitution.
9. **Unit – IX:** Enforcing rights through writs.
10. **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, Allahabad, Central Law Agency, 1998.
3. Granville Austin: The Indian Constitution . Corner Stone of a Nation-Oxford, NewDelhi, 2000.

## **ENVIRONMENTAL SCIENCE AND HEALTH**

### **Introduction to environment and health**

1. Sources, health hazards and control of environmental pollution.
2. 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.
3. Domestic refuse, sullage, human excreta and sewage, their effects on environment and health, methods and issues related to their disposal.
4. Awareness of standards of housing and the effect of poor housing on health.
5. 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 undergraduate courses By Erach Bharucha Reprinted in 2006, Orient Longman Private Limited /Universities Press India Pvt. Ltd.

## MAIN SUBJECTS

### Third Year B.Sc. Operation Theatre Technology

#### Paper 1: Anaesthesia and Operation Theatre Technology - Clinical

1. Physical facility.
2. Layout of operation theatres.
3. Transition.
4. Peripheral support areas.
5. Operating room.
6. Special procedure rooms.
7. Potential sources of injury to the care giver & patient.
8. Principles of asepsis & sterile technologies.
9. Asepsis, surgical scrub, gowning & gloving
10. Decontamination & disinfections.
11. Sterilization assembly & packing.
12. Thermal sterilization.
13. Chemical sterilization.
14. Radiation sterilization.
15. Anaesthesia equipments
16. Fabrication.
17. Classification.
18. Powered surgical instruments.
19. Handling instruments.
20. Anaesthesia Ventilator and Workstation
21. Electro cautery.
22. Laser.
23. Microsurgery.
24. Ultra-sonography.
25. Monitoring Equipment
26. Defibrillator
27. Positioning after anaesthesia
28. Preparation and draping of the patient
29. General surgery.
30. Orthopaedic procedures.
31. E.N.T. Procedures
32. Ophthalmic procedures

33. Urology procedures.
34. Endoscopic procedures.
35. Anaesthesia in M.R.I Room.

## **Paper 2: Anaesthesia and Operation Theatre Technology - Applied**

1. Preoperative preparation of the patient.
2. Diagnostic procedures.
3. Pathological examination.
4. Radiological examination.
5. MRI.
6. Nuclear medicine studies.
7. Ultra-sonography.
8. Endoscopy.
9. Anaesthesia techniques.
10. History of Anaesthesia.
11. Types of anaesthesia.
12. Choice of anaesthesia.
13. General anaesthesia.
14. Indication of general anaesthesia.
15. Endo tracheal intubation / LMA
16. Maintenance.
17. Monitoring during Anaesthesia.
18. Emergency Anaesthesia.
19. Balanced anaesthesia.
20. Care of anaesthetized patient.
21. Local & regional anaesthesia.
22. Spinal and epidural anaesthesia.
23. Intravenous anaesthesia agents.
24. Inhalation anaesthetic agents.
25. Anaesthetic adjuvant drugs.
26. Complication of general anaesthesia.
27. Complication of local/regional anaesthesia.
28. Blood transfusion and complications.
29. Anaesthesia machine & central gas supply.
30. Drugs and equipment for difficult intubation.



### **Paper 3: Anaesthesia and Operation Theatre Technology - Advanced**

1. Preparation, nursing requirement, equipments including instruments, sutures, etc.
2. Anaesthesia techniques, patient positioning & recovery.
3. Gynecological /obstetric Anaesthesia.
4. Labour Analgesia
5. Anaesthesia for Neuro Surgery.
6. Anaesthesia for Vascular Surgery.
7. Anaesthesia for Plastic and reconstructive surgery.
8. Anaesthesia for Head and Neck procedures.
- 9.. Anaesthesia for Thoracic surgery.
10. Anaesthesia for Cardiac surgery.
11. Anaesthesia for Renal transplant
12. Oxygen therapy in the ICU
13. Weaning from the ventilator.
14. Complications in the ICU.
15. Patient management in the terminally ill.

## SUBSIDIARY SUBJECTS

### Third B.Sc. Anaesthesia and Operation Theatre Technology

#### BIO STATISTICS AND RESEARCH METHODOLOGY

Teaching Hours: 20 Hours

#### 1. Course description

Introduction to basic statistical concepts.

Methods of statistical analysis and interpretation of data.

Introduction to research methodology

#### 2. Objectives

Understands statistical terms.

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

#### 3. Contents

##### a) Unit – I: Introduction

i. Meaning, definitions, and types of statistics.

ii. Statistics as a singular and plural noun

iii. Branches of statistics.

iv. Application of statistics in medicine.

##### b) Unit – II: Presentation of data

i. Definition and types of data

ii. Raw data, the array, frequency distribution.

iii. Basic definitions and principles of tabular presentation

iv. Basic principles of graphical representation.

v. Types of diagrams: Bar, pie, line, histograms, pictogram.

##### c) Unit - III: Measure of central tendency

i. Need for measures of central tendency.

ii. Definition and calculation of mean: ungrouped and grouped.

iii. Meaning, interpretation and calculation of median ungrouped and grouped.

iv. Meaning and calculation of mode ungrouped and grouped.

v. Selection of an appropriate measure of central tendency.

- d) Unit - IV: Measure of variability**
- i. Need for measure of variation.
  - ii. Range and mean deviation.
  - iii. Variance and standard deviation.
  - iv. Calculation of variance and standard deviation ungrouped and grouped.
  - v. Properties and uses of variance and SD.
- e) Unit -V: Probability and standard distributions.**
- i. Meaning of probability and standard distributions.
  - ii. Priori and posteriori probabilities
  - iii. The Binominal and Poisson distributions.
  - iv. The normal distribution.
  - v. Divergence from normality: skewness, kurtosis.
- f) Unit - VI: Sampling techniques**
- i. Population, sample and sampling.
  - ii. Methods and types of sampling.
  - iii. Random and non-random sampling
  - iv. Parameter and statistic.
  - v. Basic concepts and terms related to test of significance.
- g) Unit - VII: Introduction to research methodology**
- i. Definition and characteristics of research.
  - ii. Levels and types of research.
  - iii. Experimental and non-experimental study designs.
  - iv. Definitions of case report, case series, case-control and cohort studies.

#### **RECOMMENDED BOOKS:**

- 1) KR Sundaram, SN Dwivedi and V Sreenivas (2010): Medical Statistics, Principles and Methods, BI Publications Pvt Ltd, New Delhi, India.
- 2) A Indrayan (2008): Basic Methods of Medical Research, Second edition, AITBS Publishers, India.
- 3) NSN Rao and NS Murthy (2008): Applied Statistics in Health Sciences, First Edition, JAYPEE brothers' medical publishers (P) Ltd, India.
- 4) A. Mustafa (2010): Research Methodology, First edition, AITBS Publishers, India.

## **BASICS IN COMPUTER APPLICATIONS**

### **1. Introduction to data processing**

Features of computers, advantages of using computers, getting data into / out of computers, role of computers, data processing, application areas of computers involved in data processing, common activities in processing, types of data processing, characteristics of information, hardware and software.

### **2. Hardware Concepts**

Architecture of computers, classification of computers, concept of damage, types of storage devices, characteristics of discs, tapes, terminals, printers, network, applications of networking, concept of PC system care, floppy care, data care.

### **3. 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.

### **4. Principles of programming**

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

### **5. Data processing**

Computers in physical therapy: principles in EMG, exercise testing equipment, laser.

# ETHICS

## 1. Introduction

Medical ethics is a systematic effort to work within the ethos of medicine, which has traditionally been service to sick.

## 2. Objectives

Identify underlying ethical issues and problems in medical practice .

## 3. Course contents (Syllabus)

### a. Introduction to medical ethics

What is ethics, what are values and norms, freedom and personal responsibility?

### b. Definition of medical ethics

Major principles of medical ethics.

### c. Perspective of medical ethics

The Hippocratic oath, The Declaration of Helsinki, The WHO Declaration of Geneva, International code of Medical Ethics (1993), Medical Council of India Code of Ethics (2002).

### d. Ethics of the individual

Truth and confidentiality, the concept of disease, health and healing, the right to health.

### e. The ethics of human life

Prenatal sex determination.

### f. The family and society in medical ethics

Euthanasia, cancer and terminal care.

### g. Death and dying

Use of life-support systems, the right to die with dignity, suicide – the ethical outlook.

### h. Professional Ethics

Contract and confidentiality, malpractice and negligence.

## 4. Teaching/Learning Experience

a. Increasing the awareness and knowledge of students

of the value dimensions of interactions with the patients, colleagues, relations and public.

b. Fostering the development of skills of analysis, decision making and judgment.

c. Making the students aware of the need to respect the rights of the patient.

d. Duties and responsibilities of the technologists.