



**YENEPOYA UNIVERSITY**

**Deralakatte, Mangaluru - 575018**

**REGULATIONS AND CURRICULUM GOVERNING**

**UNDERGRADUATE PROGRAM**

**B.Sc RESPIRATORY CARE TECHNOLOGY**

**(CURRICULUM - EFFECTIVE FROM 2016-17)**

**ATTESTED**  


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Recognized under Sec 3(A) of the UGC Act 1956 as per Notification No. F.9-11/2007-U.3 (A) dated 27<sup>th</sup> February 2008

"Accredited by NAAC with 'A' Grade"

Ref: No. YU/REG/ACA/27-ACM/2016

25.01.2017

**NOTIFICATION**

Sub: Starting of (1) B.Sc. Respiratory Care Technology and  
(2) B.Sc. Cardiac Care Technology courses during the  
Academic year 2016 - 17

Ref: 27<sup>th</sup> meeting of the Academic Council held on 09.01.2017 (Agenda-8)

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The Academic Council at its 27<sup>th</sup> meeting held on 09.01.2017 vide Agenda – 8 has approved the revised curriculum for the B.Sc. Respiratory Care Technology and B.Sc. Cardiac Care Technology as proposed by the Board of Studies concerned and recommended by the Faculty of Medicine.

The course may be started during the academic year 2016-17 with annual intake of 10 for each programme.

  
**(Dr. G. Shreekumar Menon)**  
**REGISTRAR**

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Copy to:

1. Principal – YMC
2. Coordinator, B.Sc. Tech. Courses
3. CoE
4. Academic Section

# **SECTION I**

# REGULATIONS

## Course Title and Summary:

**Name of the Course:** B.Sc. Respiratory Care Technology

The Prescribed course will be an Intensive full time 3 ½ years program including classroom lectures and practical training. During the training the students shall be posted to the Physiological and Respiratory Laboratories, Respiratory Intensive Care, Medical Intensive Care, Intensive Coronary Care, Surgical Intensive Care, Emergency Units; beside postings in wards.

### **a) Goal**

The aim of teaching the undergraduate student in B.Sc. Respiratory Care Technology is to impart such knowledge and skills that may enable him/her to diagnose and manage the Respiratory Cases in the ward and ICU setting and to handle the equipment's used in Managing Respiratory Cases.

### **b) Objectives**

#### **Knowledge**

At the end of the course of B.Sc. Respiratory Care Technology, the student shall be able to:

1. Demonstrate knowledge of common chest diseases, their clinical manifestations, including emergent situations and of investigative procedures to confirm their diagnosis;
2. Demonstrate comprehensive knowledge of various modes of therapy used in treatment of respiratory diseases;
3. Describe the mode of action of commonly used drugs, their doses, side-effects / toxicity, indications-and contra-indications and interactions;
4. Describe commonly used modes of management including medical and surgical - procedures available for treatment of various' diseases.

## **Skills**

The student shall be able to:

1. Interview the patient, elicit relevant and correct information and describe, the history in chronological order;
2. Conduct clinical examination, elicit and interpret clinical findings and diagnose common respiratory diseases.
3. Perform simple, routine investigative and office procedures required for making the bedside diagnosis, especially sputum collection and examination for etiologic organisms especially acid-fast bacilli (AFB), interpretation of the chest x-rays and respiratory function tests; .
4. Interpret and manage various blood gases and pH abnormalities in various respiratory diseases;
- 5: Manage common diseases recognizing need for referral for specialized care, in case of inappropriateness of therapeutic response;
6. Assist in the performance of common procedures, like laryngoscopy examination, pleural aspiration, respiratory physiotherapy, laryngeal intubation and pneumo-thoracic drainage aspiration.
7. Operate and set Basic Equipment's used in Respiratory Care and Management of Patients.

## **Eligibility for Admission:**

A candidate seeking admission to the Bachelor of Science Degree in Respiratory Care 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.

**Duration of the Course:** Duration shall be for a period of three years followed by six months of internship.

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

**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 in 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

**Internal Assessment (IA):**

There shall be minimum of three periodical Internal Assessment (IA) tests in theory and practical for 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.

Due to certain reasons if the department/college conducts fourth Internal Assessment the same shall be conducted at least one month before the University Examination. The average marks of the best two tests will be calculated and after reducing the marks suitably as specified.

The marks of IA shall be communicated to the university at least 15 days before the commencement of the University examination. 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 department/college 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.

**Subject and Hours of Teaching for Theory and Practical's:**

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 SUBJECTS AND NUMBER OF HOURS OF  
TEACHING IN FIRST YEAR SUBJECTS**

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

a) **Note:** The classes in main and subsidiary subjects are to be held from Monday to Thursday. On Fridays and Saturday's students shall work in the respective specialty or department chosen by them.

b) **Hospital Posting:470hours**

Monday to Saturday : 9:00a.m.to 1:00p.m...

Friday : 9:00a.m. to 11:00am



**TABLE II: DISTRIBUTION OF SUBJECTS AND NUMBER OF HOURS OF TEACHING IN SECOND YEAR**

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

**TABLE III: DISTRIBUTION OF SUBJECTS AND NUMBER OF HOURS OF TEACHING IN THIRD YEAR SUBJECTS**

Sl. No.	Subjects	No. of Hours			
		Theory	Practical	Clinical Posting	Total
<b>A</b>	<b>Main Subjects</b>				
1	Respiratory Care Technology- Clinical	50	50	250	350
2	Respiratory Care Technology– Applied	50	50	250	350
3	Respiratory Care Technology - Advanced	50	150	250	350
	<b>Total</b>	<b>150</b>	<b>150</b>	<b>750</b>	<b>1050</b>
<b>B</b>	<b>Subsidiary subjects</b>				
1	Ethics	20			
2	Research and Biostatistics	10			
3	Computer application	10			

**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

**Scheme of Examination:**

There shall be University examinations at the end of each academic year.

**First Year Examination:**

The examination for both main and subsidiary subjects for all courses in Allied health Science shall be common in the first year.

The University examination for I<sup>st</sup> year shall consist of theory examination only.

**Second- and Third-Year Examination:**

The University examination for II<sup>nd</sup> and III<sup>rd</sup> year shall consist of written Examination & Practical.

Evaluation is based on Formative Evaluation (Internal Assessment) and Summative Evaluation (University Examination).

**DISTRIBUTION OF MARKS FOR MAIN/SUBSIDIARY SUBJECTS FOR THE  
FIRST YEAR THEORY EXAMINATION**

Sl. No.	Subjects	Written Paper		IA Theory	Total
		Duration	Marks	Marks	Marks
<b>A.</b>	<b>Main Subjects</b>				
1.	Basic Anatomy (Including Histology)	3 hours	80	20	100
2.	Physiology	3 hours	80	20	100
3.	Biochemistry- 1	3 hours	80	20	100
4.	Pathology – 1	3 hours	80	20	100
5.	Microbiology – 1	3 hours	80	20	100
<b>B.</b>	<b>Subsidiary Subjects</b>				
1.	English	2 hours	40	10	50
2.	Kannada	2 hours	40	10	50
3.	Healthcare	2 hours	40	10	50

**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.

**DISTRIBUTION OF MARKS FOR MAIN/SUBSIDIARY SUBJECTS FOR SECOND  
YEAR EXAMINATION**

Sl. No.	Subjects	Theory				Practical			Grand Total
		Theory	Viva Voce	IA	Sub Total	Practical	IA	Sub Total	
	<b>Main Subjects</b>								
	Section A: Applied Pathology	50	30	20	150	40	10	50	200
	Section B: Applied Microbiology	50							
	Introduction to Respiratory Care Technology	100	30	20	150	40	10	50	200
	Pharmacology	80	--	20	100	No practical			100
	Medicine relevant to Respiratory Care Technology	80	--	20	100	No practical			100
	<b>Subsidiary Subjects</b>								
		<b>Duration</b>	<b>Marks</b>	<b>IA Theory Marks</b>	<b>Total Marks</b>				
	Sociology	3hours	80	20	100				
	Constitution of India	3hours	80	20	100				
	Environmental Science & Health	3hours	80	20	100				

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

**DISTRIBUTION OF MARKS FOR MAIN/SUBSIDIARY SUBJECTS FOR THE  
THIRD YEAR EXAMINATION**

Sl. No.	Subjects	Theory				Practical			Grand Total
		Theory	Viva Voce	IA	Sub Total	Practical's	IA	Sub Total	
<b>A.</b>	<b>Main Subjects</b>								
1.	Respiratory Care Technology - Clinical	100	30	20	150	120	30	150	600
2.	Respiratory Care Technology - Applied	100	30	20	150	(40+	(10+		
3.	Respiratory Care Technology - Advanced	100	30	20	150	40)	10)		
<b>B.</b>	<b>Subsidiary Subjects</b>	<b>Duration</b>		<b>Marks</b>		<b>IA</b>		<b>Total Marks</b>	
1.	Ethics	3hours		80		20		100	
2.	Research & Biostatistics	3hours		80		20		100	
3.	Computer application	3hours		80		20		100	

**Note:**

- a) 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.
- b) Examination for subsidiary subjects shall be conducted by respective college

**DISTRIBUTION OF TYPE OF QUESTIONS AND MARKS FOR THEORY PAPERS  
OF MAIN SUBJECTS:**

<b>Type of Questions</b>	<b>No. Of Questions</b>	<b>Marks</b>	<b>Total</b>
<b>Long Essay (LE)</b>	3 (To attempt 2)	02 × 10	20
<b>Short Essay (SE)</b>	8 (To attempt 6)	06 × 05	30
<b>Short Answer(SA)</b>	12 (To attempt 10)	10 × 03	30
<b>TOTAL MARKS</b>			80

**Note:**

- a) 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.
- b) Examination for subsidiary subjects shall be conducted by respective college.

### QUESTION PAPER PATTERN:

For 100 marks question paper

Type of Questions	No. of Questions	Marks for Each Questions	Total
Essay type	03(02×10)	10	20
Short Essay type	12(10×05)	05	50
Short Answer type	12(10×03)	03	30

For 80 marks question paper

Type of Questions	No of Questions	Marks for Each Questions	Total
Long Essay	03(02×10)	10	20
Short Essay	08(06×05)	05	30
Short Answers	12(10×03)	03	30

For 50 marks question paper

Type of Questions	No of Questions	Marks for Each Questions	Total
Long Essay	03(02×10)	10	20
Short Essay	05(03×05)	05	15
Short Answers	07(05×03)	03	15

## PRACTICAL EXAMINATION

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

### Applied Pathology

Sl. 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>

### 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 hemo dialysis water/distilled water /de-ionized water, based on growth of colonies in BHI Agar to be reported as XCFU/unit	05
	<b>Total</b>	<b>20</b>

- c) There shall be no University practical examination in Applied Pharmacology and Medicine Relevant to Respiratory Care Technology.
- d) 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.



**Board of Examiners:**

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

**Criteria for Pass:**

In the first year 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.

For a pass in Theory / Practical, a candidate has to secure a minimum of 40% marks in the University conducted examination including Internal Assessment.

Further a candidate shall be declared to have passed the examination in a subject if he/she secures aggregate of 50% of the marks in theory and practical.

**Declaration of Class:**

Class will be awarded only to those candidates who pass the entire examination in the first attempt. Class shall be declared on the basis of the aggregate of marks scored in individual year.

75% and above first class with Distinction

60% and above but less than 75% First class

50% and above but less than 60% Second class

**Carry Over****First Year Examination:**

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

**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.

**Supplementary Examination:**

For the failed candidates or candidates promoted to II year but having carryover subject(s) shall be given a chance of supplementary exam after minimum 04 months of the declaration of the University results.

**Internship**

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

**Rules for Grace Marks:**

Grace marks up to a maximum of 05 marks may be awarded at the discretion of the University to a student who has failed only in one subject to enable him to pass in the examination in the first attempt.

**Re – Totaling:**

Re – Totaling of marks is permitted only for theory papers. The university, on application within the stipulated time and remittance of prescribed fee, shall permit a re-totaling of marks, for the subjects (s) applied. The marks obtained after re-totaling will be the final marks awarded and communicated to the students.

**Eligibility for the award of Degree:**

A Candidate shall have passed in all the subjects of first, second and third year shall be eligible for award of degree.

**Award of Ranks:**

Ranks will be awarded on the basis of aggregate marks of I to III-year examination.

Only those candidates who have completed the course in the minimum number of years prescribed (3years) and who have passed all the 3 years in the first attempt are eligible for the award of ranks

**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.

# SECTION II

## COURSE CONTENTS FIRST YEAR MAIN SUBJECTS

### **ANATOMY**

No. of Theory classes: 70 hours

No. of Practical classes: 20 hours

#### **I. Introduction: Human body as a whole**

##### **Theory:**

Definition of Anatomy and its divisions

Terms of location, positions and planes

Cell and its organelles

Epithelium: definition, classification, describe with examples, function

Glands: classification, describe serous & mucous glands with examples

Basic tissues: classification with examples

##### **Practical:**

Histology of types of epithelium

Histology of serous, mucous and mixed salivary gland.

#### **2. Locomotion and Support**

##### **Theory:**

Cartilage - types with example & histology.

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

##### **Practical:**

Histology of the 3 types of cartilage

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

Histology of compact bone (TS & LS)

Demonstration of all muscles of the body

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

### **3. Cardiovascular system**

#### **Theory:**

Heart: size, location, chambers, exterior & interior

Blood Supply of Heart.

Systemic & Pulmonary Circulation

Branches of aorta, common carotid artery, subclavian artery, axillary artery, brachial artery, Superficial palmar arch, femoral artery, internal iliac artery

Peripheral pulse

Inferior 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.

#### **Practical:**

Demonstration of heart and vessels in the body

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

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

Histology of lymph node, spleen, tonsil & thymus

Normal chest radiograph showing heart shadows

Normal angiograms

### **4. Gastro-intestinal system**

#### **Theory:**

Parts of GIT, Oral cavity, lip, tongue (with histology), tonsil, dentition, pharynx, salivary glands, Waldeyer's ring)

Esophagus, stomach, small and large intestine, Liver, Gall bladder, Pancreas

Radiographs of abdomen

Histology in brief

**Practical:**

Demonstration of parts of gastro intestinal system

Normal radiographs of gastro intestinal system

Histology of gastro intestinal system

**5. Respiratory system****Theory:**

Parts of RS, nose, nasal cavity, larynx, trachea, lungs, broncho pulmonary segments

Histology of trachea, lung and pleura

Names of paranasal air sinuses

**Practical:**

Demonstration of parts of respiratory system.

Normal radiographs of chest

Histology of lung and trachea

**6. Peritoneum****Theory:**

Description in brief

**Practical:**

Demonstration of reflections

**7. Urinary system****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

**8. Reproductive System****Theory:**

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

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

Mammary gland-gross.

**Practical:**

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

Histology of testis, vas deferens, epididymis, prostate, uterus, fallopian tubes, ovary

Radiographs of pelvis - hysterosalpingogram

**9. Endocrine glands**

**Theory:**

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

**Practical:**

Demonstration of the glands

Histology of pituitary, thyroid, parathyroid, suprarenal glands

**10. Nervous system**

**Theory:**

Neuron

Classification of NS

Cerebrum, cerebellum, midbrain, pons, medulla oblongata, spinal cord with spinal nerve (gross & histology)

Meninges, Ventricles & cerebrospinal fluid

Names of basal nuclei Blood supply of brain

Cranial nerves

Sympathetic trunk & names of parasympathetic ganglia

**Practical:**

Histology of peripheral nerve & optic nerve

Demonstration of all plexuses and nerves in the body

Demonstration of all part of brain

Histology of cerebrum, cerebellum, spinal cord

## **11. Sensory organs**

### **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

### **Practical:**

Histology of thin and thick skin

Demonstration and histology of eyeball

Histology of cornea & retina

## **12. Embryology:**

### **Theory:**

Spermatogenesis & oogenesis

Ovulation, fertilization

Fetal circulation

Placenta

Internal assessment

Theory- Average of two exams conducted - 20

Practical's - Record & Lab work - 10

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

**Scheme of Examination  
Theory**

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

<b>TYPE OF QUESTIONS</b>	<b>NUMBER OF QUESTIONS</b>	<b>MARKS</b>	<b>TOTAL</b>
<b>LONG ESSAY (LE)</b>	3 (To attempt 2)	02 x 10	20
<b>SHORT ESSAY (SE)</b>	8 (To attempt 6)	06 x 05	30
<b>SHORT ANSWER(SA)</b>	12 (To attempt 10)	10 x 03	30
<b>TOTAL MARKS</b>			80

**NO PRACTICAL EXAMINATION**

**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 Black swan Pvt. Ltd.
5. Renu Chairman. TB Anatomy
6. Text Book of Embryology. IB Singh



# PHYSIOLOGY

No. of Theory classes: 70 hours

No. of Practical classes: 20 hours

## Blood

**Introduction** - Composition and function of blood

Red blood Cells- Erythropoiesis, stages of differentiation function, count physiological Variation.

Hemoglobin- Structure, functions, concentration physiological variation, Methods of Estimation of Hb

White Blood Cells - Production, function, life span, Total count, Differential count

Platelets - Origin, normal count, morphology functions.

Plasma Proteins -Production, concentration, types, albumin, globulin, Fibrinogen Prothrombin functions

Homeostasis& Blood coagulation

Homeostasis - Definition, normal homeostasis, 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 in compatibility

Blood transfusion - Indication, universal donor and recipient concept

Selection criteria of a blood donor, transfusion reactions

Anticoagulants – Classification, examples and uses

Anemia – Classification-Morphological and etiological. Effects of anemia on body

Blood indices - Color 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

## Cardiovascular system

Heart - Physiological Anatomy, Nerve supply

Properties of Cardiac muscle

Cardiac cycle-systole, diastole. Intraventricular 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, cause characteristics and signification. Heart rate

Electrocardiogram (ECG) -significance.

Digestive System - Physiological anatomy of Gastro intestinal tract, Functions of digestive system, Salivary glands, Structure and functions.

Deglutination -stages and regulation

Stomach - structure and functions

Gastric secretion - Composition function regulation of gastric juice secretion

Pancreas - structure, function, composition, regulation of pancreatic juice

Liver - functions of liver

Bile secretion, composition, function regulation of bile secretion. Bilirubin metabolism types of bilirubin, Vandenberg reaction, Jaundice- types, significance.

Gall bladder - functions

Intestine - small intestine and large intestine small intestine -Functions- Digestive, absorption, movements.

Large intestine - Functions, Digestion and absorption of Carbohydrates, Proteins, Fats, Lipids. Defecation

### **Respiratory system**

Functions of Respiratory system, Physiological Anatomy of Respiratory system, Respiratory tract, Respiratory Muscles, Respiratory organ-lungs, Alveoli, Respiratory membrane, stages of respiration.

Mechanism of normal 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 what? Why? How? Mechanisms of Regulation, nervous and chemical regulation. Respiratory Centre. Hearing Brier Reflexes.

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

### **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 gland, Adrenal cortex physiologic anatomy of adrenal gland, Adrenal cortex, cortical hormones - functions and regulation

Adrenal medulla- Hormones, regulation and secretion. Functions of Adrenaline and noradrenaline

Pituitary hormones - Anterior and posterior pituitary hormones, secretion, function

Pancreas - Hormones of pancreas

Insulin - secretion, regulation, function and action

Diabetes mellitus - Regulation of blood glucose level

Parathyroid gland- function, action, regulation of secretion of parathyroid hormone. Calcitonin - function and action

Special senses

Vision - structure of eye. Function of different parts

Structure of retina

Hearing structure and function of can mechanism of hearing

Taste - Taste buds' functions. Smell physiology, Receptors.

## **Nervous System**

Functions of Nervous system, Neuron structure, classification and properties, Neuroglia, nerve fiber, classification, conduction of impulses continuous and salutatory. 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- Extra pyramidal 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 para sympathetic distribution and functions and comparison of functions.

## **Excretory System**

Excretory organs

Kidneys: Functions of kidneys, structural and functional unit nephron, vasarecta, cortical and juxta medullary nephrons - Comparison, Juxta-Glomerular Apparatus -Structure and function.

Renal circulation peculiarities

Mechanism of Urine formation: Ultra filtration criteria for filtration GFR, Plasma fraction, EFP, factors effecting EFR. Determination of GFR selective re absorption - sites of re absorption, substance reabsorbed, mechanisms of re absorption Glucose, urea.

H + Cl amino acids etc. TMG, Tubular load, Renal threshold % of re absorption 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, Innervations of Bladder, Cysto-urethrogram

Diuretics: Water, Diuretics, osmotic diuretics, artificial kidney renal function tests – plasma clearance Actions of ADH, Aldosterone and PTH on kidneys. Renal function tests

## **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.

## **Muscle nerve physiology**

Classification of muscle, structure of skeletal muscle, Sarcomere contractile proteins, Neuromuscular junction. Transmission across Neuro muscular junction. Excitation contraction coupling. Mechanism of muscle contraction muscle tone, fatigue Rigor mortis

## **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.

## **Practical's**

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

## **Internal Assessment**

**Theory** :Average of two exams conducted - 20

**Practical's** :Record & Lab work - 10

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

### **Scheme of Examination Theory**

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

<b>TYPE OF QUESTION</b>	<b>NO OF QUESTIONS</b>	<b>MARKS</b>	<b>SUB-TOTAL</b>
<b>LONG ESSAY (LE)</b>	3 (To attempt 2)	2 x 10	20
<b>SHORT ESSAY (SE)</b>	8 (To attempt 6)	6 x 5	30
<b>SHORT ANSWER (SA)</b>	12 (To attempt 10)	10 x 3	30
<b>TOTAL MARKS</b>			80

### **NO PRACTICAL EXAMINATION**

#### **REFERENCE BOOKS:**

#### **PHYSIOLOGY**

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

# BIOCHEMISTRY

No. of 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, Erlenmeyer conical etc.)

Funnels - different types (Conical, Buchner etc.)

Bottles - Reagent bottles - graduated and common, Wash bottles - different type Specimen bottles etc.,

### 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 Desiccator, Stopwatch, Rimers, scissors

Dispensers - reagent and sample

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

Maintenance of lab glassware and apparatus:

Glass and plastic ware in Laboratory

\*Use of glass: significance of boro silicate glass; care and cleaning of glass ware, different cleaning solutions of glass

\*Care and cleaning of plastic ware, different cleaning solutions

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

Water bath: Use, care and maintenance

Oven & Incubators

Water Distillation plant and water deionizer's

Refrigerators, cold box, deep freezers

Reflux condenser: Use, care and maintenance

Centrifuges: (Theory and Demonstration) Diagrams to be drawn)

Definition, Principle, svedberg unit, centrifugal force, centrifugal field rpm, Conversion of G to rpm and vice versa,

Different types of centrifuges,

Laboratory balances :( Theory and Practical's) Diagrams to be drawn)

Manual balances: Single pan, double pan, trip balance,  
Direct read out electrical balances.

Use care and maintenance, Guideline to be followed and precautions to be taken while weighing. Weighing different types of chemicals, liquids. Hygroscopic compounds etc. (Theory & Practical's) Diagrams to be drawn.

Colorimeter and spectrophotometer (Theory and Practical's) Diagrams to be drawn

Principle, Parts Diagram. Use, care and maintenance.

pH meter (Theory & practical's) Diagrams to be drawn

principle, parts, Types of electrodes, salt bridge solution

Use, care and maintenance of Ph meter and electrodes

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

## 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 uncertainly principle

Electronic configuration - Aufbau principle, Pauli's exclusion principle, etc., m

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

Theory & Practical's for all the following under this section

Molecular weight, equivalent weight of elements and compounds, normality molarity

Preparation of molar solutions (mole/liter 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. e.g., 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 NH<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 2 NHCl etc., Preparing working standard from stock standard, Body fluid dilutions, Reagent dilution techniques, calculating the dilution of a solution, body fluid reagent etc.,

Saturated and supersaturated solutions Standard solutions. Technique for preparation of standard solutions e.g.: 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.

Different between bases and alkali, acidity and basicity, monophotonic and polyprotionic acids and bases

Concepts of acid base reaction, hydrogen ion concentration, Ionization 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 Practical's)

Theory-Definition, concept, mechanism of dissociation of an indicator, color 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

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

**Quality control:** Accuracy  
Precision  
Specificity  
Sensitivity  
Limits of error allowable in laboratory  
Percentage error

Normal values and Interpretations

### 11. Special Investigations:

Serum Electrophoresis  
Immunoglobulin  
Drugs: Digitoxin, Theophylline's

Regulation of Acid Base status:  
Henderson Hasselback Equations  
Buffers of the fluid

pH Regulation, Disturbance in acid Base Balance  
Anion Gap  
Metabolic acidosis  
Metabolic acidosis  
Metabolic alkalosis  
Respiratory acidosis  
Respiratory alkalosis  
Basic Principles and estimation of Blood Gases and pH  
Basic principles and estimation of Electrolytes  
Water Balance  
Sodium regulation  
Bicarbonate buffers  
Nutrition, Nutritional support with special emphasis on parental nutrition.  
Calorific Value  
Nitrogen Balance  
Respiratory Quotient



Basal metabolic rate  
Dietary Fibers, Nutritional importance of lipids, carbohydrates and proteins, Vitamins.

## **PRACTICALS**

Analysis of Normal Urine  
Composition of urine  
Procedure for routine screening.

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

4. Estimation of Blood sugar, Blood Urea and electrolytes  
5. Demonstration of Strips  
Demonstration of Glucometer

### **Internal Assessment**

Theory : Average of two exams conducted 20  
Practical's : Record & Lab work 10

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

### **Scheme of Examination Theory**

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

<b>TYPE OF QUESTION</b>	<b>NUMBER OF QUESTIONS</b>	<b>MARKS</b>	<b>SUB-TOTAL</b>
<b>LONG ESSAY (LE)</b>	3 (To attempt 2)	2 x 10	20
<b>SHORT ESSAY (SE)</b>	8 (To attempt 6)	6 x 5	30
<b>SHORT ANSWER (SA)</b>	12 (To attempt 10)	10 x 3	30
<b>TOTAL MARKS</b>			80

### **NO PRATICAL EXAMINATION**

### **REFERENCE BOOKS:**

1. Varley - Clinical chemistry
2. Teitz - Clinical chemistry
3. Kaplan - Clinical chemistry
4. Ramakrishna(S), Prasanna (KG), Rajna ® Text book of Medical Biochemistry Latest Ed Orient Longman Bombay -1980
5. Vasudevan (DM), Sreekumari(S) Text book of Biochemistry for Medical students, Latest Ed
6. Das(Debajyothi) Biochemistry Latest ED Academic, Publishers, Culcutta– 1992
7. Text Book of Medical Biochemistry - 3rd Edition, Orient Longman PVT Ltd
8. Practical Biochemistry for Medical Students - Rajagopal, Orient Longman PVT Ltd
9. Burtis CA and Ashwood ER, Tietz Fundamentals of Clinical chemistry, Harcourt (India) Ltd, 7<sup>th</sup> Ed, 20154.

# **PATHOLOGY**

Histopathology, Clinical Pathology, Hematology and Blood Banking

No. of Theory classes: 70 hours

No. of Practical classes: 20 hours

## **Theory**

### **1. Histopathology**

Introduction to histopathology

Bio-Medical waste management

### **Clinical Pathology –Theory**

Introduction to Clinical Pathology

Collection, Transport, Preservation and Processing of various clinical specimens

Urine Examination - Collection and Preservation of urine

### **Physical, chemical, Microscopic Examination**

Examination of body fluids

Examination of Cerebro-spinal fluid (CSF)

Sputum Examination

- Examination of feces

### **Hematology – Theory**

- Introduction to Hematology
- Normal constituents of Blood, their structure and function.
- Collection of Blood samples
- Various Anticoagulants used in Hematology
- Various 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 Homeostasis
- Bleeding Time, Clotting Time, Prothrombin Time, Activated Partial Thromboplastin Time.

### **Blood Bank**

- Introduction
- Blood grouping and Rh Types

- Cross matching

### **PRACTICALS**

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

Histopathology - Section cutting and H &E Staining [For BSc MLT only]

### **Internal Assessment**

Theory	: Average of two exams conducted.	20
Practical's	: Record & Lab work*	10

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

### **Scheme of Examination Theory**

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

<b>TYPE OF QUESTION</b>	<b>NO. OF QUESTIONS</b>	<b>MARKS</b>	<b>SUB-TOTAL</b>
<b>LONG ESSAY (LE)</b>	3 (To attempt 2)	2 x 10	20
<b>SHORT ESSAY (SE)</b>	8 (To attempt 6)	6 x 5	30
<b>SHORT ANSWER (SA)</b>	12 (To attempt 10)	10 x 3	30
<b>TOTAL MARKS</b>			80

### **NO PRACTICAL EXAMINATION**

### **REFERENCE BOOKS:**

1. Culling Histopathology techniques
2. Bancroft Histopathology techniques
3. Koss - cytology
4. Winifred greg - Diagnostic cytopathology
5. Orell - Cyto Pathology
6. Todd & Sanford Clinical Diagnosis by laboratory method
7. Dacie& Lewis - Practical Hematology
8. RamanicSood, Laboratory Technology (Methods and interpretation) 4th Ed. J.P. Bros, New Delhi -1996
9. Satish Gupta Short text book of Medical Laboratory for technician J.P. Bros, New Delhi - 1998
10. Sachdev K.N. Clinical Pathology and Bacteriology 8th Ed, J.P. Bros, New Delhi-1991
11. Krishna - Textbook of Pathology, Orient Longman PVT Ltd. Bacteriology 8th Ed, J.P. Bros, New Delhi-1991

# MICROBIOLOGY

## Objective:

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

- Principles & practice of sterilization methods
- Collection and dispatch of specimens for routine microbiological investigations
- Interpretation of commonly done bacteriological and serological investigations
- Control of Hospital infections
- Biomedical waste management
- Immunization schedule

## Theory Topic

### Unit 1: Introduction

Historical aspects

Definitions and terms in Microbiology, classification of microbes

Contribution of Louis Pasteur & Robert Koch

Morphology and anatomy of Bacteria

Morphological classification

cell structure, cell wall, capsule and spore, Flagella, pili

### Unit 2: Growth and multiplication of bacteria

Bacterial growth

Growth curve

Growth requirements, generation time

Culture Media & Methods

Classification of media, definitions, examples and uses

Culture methods

### Unit 3: Sterilization and disinfection

Sterilization

Definition, Classification of methods,

Principles of dry heat (Hot air oven) and moist heat methods.

Filtration and radiation methods, chemical methods, CSSD

Disinfection

Definitions types & examples of disinfectants and antiseptics

antiseptics

with preference to commonly used antiseptics in hospital practice.

### Unit 4: Immunology

Infection

Definition, types of infection, sources and modes of transmission

Carriers- definition, types, examples

Immunity

Definition and classification.

Innate and acquired Immunity in detail.

Vaccines and immunization schedule

Humoral& cell mediated immunity

Antigen & Antibody

Antigen- definition

Antibodies-definition, classes & structure of IgG

	IgA, IgM
Antigen antibody reactions	Types of serological reactions Applications of agglutination tests & ELISA
Unit 5. Systematic Bacteriology	
Staphylococci	Morphology, infections caused by <i>S.aureus</i>
Streptococci	Morphology, classification, pathogenesis, infections caused by <i>S.pyogenes</i> including rheumatic fever and glomerulonephritis
<i>Corynebacterium diphtheriae</i>	Morphology of <i>C. diphtheriae</i> , pathogenesis, lab diagnosis and prophylaxis of diphtheria.
<i>Clostridium</i>	<i>Cl.tetani</i> : Morphology, infections caused and prophylaxis of tetanus.
<i>Salmonella typhi</i>	Morphology, pathogenesis and lab diagnosis of typhoid fever. Prophylaxis
<i>Shigella</i>	Dysentery
<i>Esch coli</i>	
	UTI
<i>Vibrio cholerae</i>	
	Morphology of <i>V. cholerae</i> , pathogenesis and lab diagnosis of cholera in brief
Mycobacteria	Morphology of <i>M. tuberculosis</i> , pathogenesis and lab diagnosis of pulmonary tuberculosis, BCG <i>M.leprae</i> and atypical Mycobacteria
Spirochaetes	Morphology, pathogenesis, clinical conditions and lab diagnosis of <i>Treponema pallidum</i> and <i>Leptospira</i>
Unit6. Virology	
General virology	Differences between bacteria and viruses. Classification of viruses – DNA and RNA viruses Properties of viruses - structure, size
Herpes Viruses	HSV, VZV- transmission and disease caused, Prophylaxis
Hepatitis viruses	Hepatitis B – Structure, transmission, disease caused, lab diagnosis and prophylaxis Hepatitis A- Transmission and prophylaxis
Rabies viruses	Structure, transmission, disease caused, lab diagnosis and prophylaxis
HIV	Structure, pathogenesis, disease caused and lab diagnosis
Polio virus	Pathogenesis and prophylaxis.
Unit 7: Mycology	
General Mycology	Introduction to fungi Classification according to morphology Importance of fungi
<i>Candida species</i>	Morphology, Pathogenesis and Lab diagnosis of <i>Candida species</i>
<i>Cryptococcus</i>	Morphology, Pathogenesis and Lab diagnosis
Dermatophytes	Morphology, Lesions produced and Lab diagnosis of dermatophytes
Opportunistic fungi	Common opportunistic fungal infections
Unit 8. Parasitology	
General Parasitology	Definition and classification of parasites and hosts

Entamoeba histolytica	Morphology, life cycle, Pathogenesis & Lab diagnosis of E .histolytica
Malaria	Morphology, life cycle, Pathogenesis & Lab diagnosis of malaria
Ancylostoma duodenale	Size, Shape, hosts, pathogenesis and lab diagnosis
Ascaris lumbricoides	Morphology, pathogenesis and lab diagnosis
Unit 9. Applied microbiology	
Hospital infection and its control	Definition of nosocomial infection, Common organisms associated, risk factors, prevention
Biomedical waste management	Importance of hospital infection control committee Principle and practices

#### PRACTICALS/ DEMONSTRATIONS ONLY SI No.

##### Topics

1. Compound Microscope
2. Demonstration and sterilization of equipments
3. Demonstration of commonly used culture media & media with growth
4. Demonstration of antibiotic susceptibility test
5. Demonstration of Bacteria by Grams stain and acid fast stain
6. Demonstration of common serological tests- Widal, VDRL RA, CRP, ASO, ELISA

Stool examination for Helminthic ova- Demonstration



### **Internal Assessment**

Theory	:	Average of two exams conducted	20
Practicals	:	Record & Lab work	10

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

### **Scheme of Examination Theory**

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

<b>TYPE OF QUESTION</b>	<b>NO. OF QUESTIONS</b>	<b>MARKS</b>	<b>SUB-TOTAL</b>
<b>LONG ESSAY (LE)</b>	3 (To attempt 2)	2 x 10	20
<b>SHORT ESSAY (SE)</b>	8 (To attempt 6)	6 x 5	30
<b>SHORT ANSWER (SA)</b>	12 (To attempt 10)	10 x 3	30
<b>TOTAL MARKS</b>			80

### **NO PRACTICAL EXAMINATION**

### **REFERENCE BOOKS:**

1. Ananthanarayana & Paniker's Textbook of Microbiology, 9<sup>th</sup> Edition, Universities Press, Orient Black Swan PVT Ltd.
2. Ananthanarayana Textbook of Microbiology for Nurses, 2<sup>nd</sup> Edition, Universities Press, Orient BlackSwan PVT Ltd.
3. Robert Cruickshank - Medical Microbiology - The Practice of Medical Microbiology, 1975, Churchill Livingstone
4. Chatterjee: Parasitology: Protozoology And Helminthology, 13<sup>th</sup> Edition, 2015,
5. John Willard Rippon, Medical Mycology: The Pathogenic Fungi and the Pathogenic Actinomycetes, Saunders, 1988
6. Emmons: Medical Mycology
7. Basic laboratory methods in Parasitology, 1st Ed, J P Bros, New Delhi – 199
8. Basic laboratory procedures in Clinical Bacteriology, 1st Ed, J P Brothers, New Delhi (WHO)
9. Rajesh Karyakarte, AjitDamle: Medical Parasitology, 3rd Edition, 2012.

## **SUBSIDIARY SUBJECTS**

### **ENGLISH**

**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.

#### **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. BEHAVIOURAL OBJECTIVES:**

The student at the end of training is able to:

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

#### **3. CONTENTS:**

##### **UNIT - I: INTRODUCTION:**

- Study Techniques
- Organization of effective note taking and logical processes of analysis and synthesis
- Use of the dictionary
- Enlargement of vocabulary
- Effective diction

##### **UNIT - II: APPLIED GRAMMAR:**

- Correct usage
- The structure of sentences
- The structure of paragraphs
- Enlargements of Vocabulary

##### **UNIT - III: WRITTEN COMPOSITION:**

- Precise writing and summarizing
- Writing of bibliography
- Enlargement of Vocabulary

##### **UNIT - IV: READING AND COMPREHENSION:**

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

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

- Paragraph, Essay
- Letter
- Summary
- Practice in writing

#### **UNIT - VI: VERBAL COMMUNICATION:**

- Discussions and summarization
- Debates
- Oral reports
- Use in teaching

#### **Scheme of Examination Theory**

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 BOOKS:**

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 Book Self Series, Writers Digest Series
7. Interviewing by Joan Clayton Platkon
8. Penguin Book of Interviews
9. English Kannada Encyclopedia Dictionary, Orient Longman PVT Ltd.

## 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 : ಎಚ್‌ಸೈ  
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**

- Definition of Health, Determinants of Health, Health Indicators of India, Health Team Concept
- National Health Policy
- National Health Programmes (Briefly Objectives and scope)
- Population of India and Family welfare programme in India

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

- What is nursing? Nursing principles; Inter-Personnel relationships
- Bandaging: Basic turns; Bandaging extremities; Triangular Bandages and their application
- Nursing Position, prone, lateral, dorsal, dorsal recumbent, Fowler's positions, comfort measures, Bed making, rest and sleep
- Lifting And Transporting Patients: Lifting patients up in the bed, Transferring from bed to wheelchair, Transferring from bed to stretcher
- Bed Side Management: Giving and taking Bedpan, Urinal
- Observation of stools, urine, sputum
- Understand use and care of catheters, giving enema
- Methods of Giving Nourishment: Feeding, Tube feeding, drips, transfusion
- Care of Rubber Goods
- Recording of body temperature, respiration and pulse
- Simple aseptic technique, sterilization and disinfection
- Surgical Dressing: Observation of dressing procedures

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

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

### **REFERENCE BOOKS:**

1. Text book of P & S M & park
2. Counseling and communicate skills for medical and health. Bayne, Orient Longman PVT LTD.

# **COURSE CONTENTS SECOND YEAR MAIN SUBJECT**

## **APPLIED PHARMACOLOGY**

General concepts about Pharmacodynamics and Pharmacokinetic Principles involved in drug activity.

### **I. Autonomic Nerves System:**

- Anatomy & Functional Organization
- Drugs acting on ANS (dose, route of administration, indications, contraindications, adverse effects)

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

- a. Anti-Hypertensive
  - Beta Adrenergic antagonists
  - Alpha Adrenergic antagonists
  - Peripheral Vasodilators
  - Calcium channel blockers
- b. Antiarrhythmic 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 Thrombolytic and anti-thrombolytic
- i. Cardioplegic drugs- History, Principles and types of cardioplagia.
- j. Primary solutions - History, principles & types
- k. Drugs used in the treatment of shock

### **III. Anesthetic agents:**

- Definition of general and local anesthetics
- Classification of general anesthetics
- Pharmacokinetics and Pharmacodynamics of inhaled anesthetic agents
- Intravenous general anesthetic agents

- Local anesthetics - 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 opioid analgesics

**V. Antihistamines and antiemetic:**

- 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 tone
- 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 administration

**XII. Chemotherapy of infections:**

- Definition
- Classification and mechanism of action of antimicrobial agents
- Combination of antimicrobial agents
- Chemoprophylaxis
- Classification, spectrum of activity, dose, routes of administration and adverse effects of penicillin, cephalosporin's, amino glycosides, tetracycline's, chloramphenicol, anti-tubercular drugs

**XIII. Miscellaneous:**

- IV fluids- various preparations and their usage
- Electrolyte supplements
- Immunosuppressive agents
- New drugs included in perfusion technology
- 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

**Scheme of Examination Theory****Theory**

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

<b>TYPE OF QUESTION</b>	<b>NUMBER OF QUESTIONS</b>	<b>MARKS</b>	<b>SUB-TOTAL</b>
<b>LONG ESSAY (LE)</b>	3 (To attempt 2)	2 x 10	20
<b>SHORT ESSAY (SE)</b>	08 (To attempt 6)	6x 5	30
<b>SHORT ANSWER (SA)</b>	12 (To attempt 10)	10 x 3	30
<b>TOTAL MARKS</b>			80

**NO PRACTICAL EXAMINATION**



### **REFERENCE BOOKS:**

1. R. S. Satoskar, S.D. Bhandarkar, S. S. Ainapure, Pharmacology and Pharmacotherapeutics, 18<sup>th</sup>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. General Pathology**

### 1. Cell injury and adaptation

1.1. Necrosis: Definition, types of necrosis with examples (Coagulative necrosis, liquefactive necrosis, caseous necrosis, fat necrosis, gangrene)

1.2. Cell growth and differentiation: Definition and examples of hypertrophy, atrophy, hyperplasia, metaplasia.

### 2. Inflammation and Repair

2.1. Inflammation: Definition, types of inflammation with examples

2.2. Vascular changes: Hemodynamic changes, changes in vascular permeability

2.3. Cellular events: Margination, adhesion, emigration, chemotaxis, phagocytosis Granulomatous inflammation

2.4. Healing & Repair: Granulation tissue, Process of healing by primary intention, Process of healing by secondary intention, Factors influencing wound healing.

### 3. Fluid and hemodynamic derangements

3.1. Edema: Definition, types of edema, pathogenesis of renal and cardiac edema, lymph edema

3.2. Shock: Definition, Types of shock, pathogenesis of septic and hypovolemic shock

3.3. Thrombosis: Definition, factors influencing thrombosis, fate of a thrombus

3.4. Embolism: Types

3.5. Infarction: Definition and type

### 4. Neoplasia:

- 4.1. Definition, nomenclature
- 4.2. Definition of dysplasia, anaplasia
- 4.3. Differences between benign and malignant tumours
- 4.4. Causes of tumours (aetiology)
- 4.5. Spread of tumours (metastasis )
- 4.6. Prognosis of tumours
5. Infectious diseases
  - 5.1. Tuberculosis: Etiology and clinical features, morphology of primary and secondary tuberculosis
  - 5.2. Leprosy: Etiology, classification, morphology of lepromatous and tuberculoid leprosy
  - 5.3. AIDS: Etiology, mode of infection, clinical features including opportunistic infections
  - 5.4. Viral hepatitis: Etiology, modes of infection and clinical features
  - 5.5. Cirrhosis liver: Causes of Jaundice
6. Genetics (basic terminologies)

## **II. 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.
- Ischemic Heart Diseases- Definition, Types. Briefly Pathophysiology, 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:**

- Anemia - Definition, morphological types and diagnosis of anemia. Brief concept about Hemolytic anemia and polycythemia
- Leukocyte disorders- Briefly leukemia, 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. Briefly causes, Pathology and complications of each type of COPD
- Pneumonia : Definition , 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 causes, mechanism, effects and laboratory diagnosis of ARF & CRS. 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
- Renal Stone

## **V. ENOCRINE SYSTEM**

Diabetes: types, clinical features & complications

## PRACTICALS

1. Description & diagnosis of the following gross specimens.
  - l. Atherosclerosis
  - m. Aortic aneurysm
  - n. Myocardial infraction
  - o. Emphysema
  - p. Chronic glomerulonephritis
  - q. 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

### **Scheme of Examination Theory**

#### **Theory**

There shall be one theory paper of three hours duration carrying 50 marks. Distribution of type of questions and marks for Applied Pathology shall be as given under

<b>TYPE OF QUESTION</b>	<b>NUMBER OF QUESTIONS</b>	<b>MARKS</b>	<b>SUB-TOTAL</b>
<b>LONG ESSAY (LE)</b>	3 (To attempt 2)	2 x 10	20
<b>SHORT ESSAY (SE)</b>	5 (To attempt 3)	3 x 5	15
<b>SHORT ANSWER (SA)</b>	7 (To attempt 5)	5 x 3	15
<b>TOTAL MARKS</b>			50

## **PRACTICAL EXAMINATION - 40 Marks**

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

<b>Sl. No.</b>	<b>Tests</b>	<b>Marks</b>
01	Interpretation of Hematology Chart	05
02	Interpretation of Urine Chart	05
03	Estimation of Hemoglobin	05
04	Estimation of Bleeding time & Clotting time	05
	Total	20

# APPLIED MICROBIOLOGY

Theory: 40 hours

**1. Health care associated infections and Antimicrobial resistance: 06 Hours**

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.

**2. Disease communicable to Healthcare workers in hospital set up and its preventive measure: 06 Hours**

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), orofaecal route (Salmonella, Hepatitis A etc), and direct contact (Herpes Simplex Virus etc). Preventive measures to combat the spread of these infections by monitoring and control.

**3. Microbiological surveillance and sampling: 06 Hours**

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

**4. Importance of sterilization: 10 Hours**

- 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

**5. Sterilization: 08 Hours**

- 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 department: the four areas and the floor plan for instrument cleaning, high-level disinfecting and sterilizing areas.

**6. Preparation of materials for autoclaving: 04 Hours**

- a. Packing of different types of materials, loading, holding time and unloading

**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.

**Scheme of Examination**

**Theory**

There shall be one theory paper of three hours duration carrying 50 marks. Distribution of type of questions and marks for Applied Microbiology shall be as given under.

<b>TYPE OF QUESTION</b>	<b>NUMBER OF QUESTIONS</b>	<b>MARKS</b>	<b>SUB-TOTAL</b>
<b>LONG ESSAY (LE)</b>	3 (To attempt 2)	2 x 10	20
<b>SHORT ESSAY (SE)</b>	6 (To attempt 4)	4 x 5	20
<b>SHORT ANSWER (SA)</b>	7 (To attempt 5)	5 x 2	10
<b>TOTAL MARKS</b>			50



### **PRACTICAL EXAMINATION - 40 Marks**

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

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

## **MEDICINE RELEVANT TO RESPIRATORY CARE TECHNOLOGY**

Brief mention about common diseases such as

- Diabetes Mellitus,
- Hypertension,
- Ischemic Heart Disease
- Obesity, Elderly, Patient Pregnancy
- Acquired Immuno-Deficiency Syndrome
- Poliomyelitis & Gullian-Barre Syndrome
- Myasthenia Gravis
- Status Epileptics
- Sepsis & Septic shock
- Poisoning

Respiratory problems in children

Pneumonia: Community Acquired, Hospital Acquired, In Immuno-Compromised Patient, Lung Abscess, Atypical Pneumonia, Common Viral And Fungal Infections, Pulmonary Tuberculosis, Tropical Eosinophilia

Respiratory Failure (Type, Signs, Causes, Assessment & Management), Adult Respiratory Distress Syndrome, Acute Lung Injury, Pulmonary edema

Bronchial Asthma and Status Asthmaticus

Chronic Obstructive Pulmonary Disease: Chronic bronchitis, Emphysema

Toxic Inhalation, Occupational Lung

Diseases of the pleura

Diseases of the mediastinum

Diseases of the chest wall

### **Scheme of Examination Theory**

There shall be one theory paper of three hours duration carrying 80 marks. Distribution of type of questions and marks for Medicine relevant to Respiratory Care Technology shall be as given under.

<b>TYPE OF QUESTION</b>	<b>NUMBER OF QUESTIONS</b>	<b>MARKS</b>	<b>SUB-TOTAL</b>
<b>LONG ESSAY (LE)</b>	3 (To attempt 2)	2 x 10	20
<b>SHORT ESSAY (SE)</b>	10 (To attempt 8)	8 x 5	40
<b>SHORT ANSWER (SA)</b>	12 (To attempt 10)	10 x 2	20
<b>TOTAL MARKS</b>			80

**NO PRACTICAL EXAMINATION**

# **INTRODUCTION TO RESPIRATORY CARE TECHNOLOGY**

## **Lectures**

### **Patient contact techniques**

#### **Nonverbal Communication**

- Aspects of nonverbal communication
- Definitions
- Characteristic

#### **Universal Precautions**

- Hand Washing
- Insolation procedures

#### **Assessment of vital signs**

- General appearance
- Sensorium
- Pulsation
- Blood pressure
- Respiration

#### **Chest topography**

- Identification of imaginary lines
- Topographical landmarks of Thorax, Lungs & Pleura

#### **Assessment of Respiratory System**

- Inspection Palpation, percussion and auscultation of respiratory system
- Definition and significance of the presence of altered resonance, abnormal breath sounds and adventitious sound

#### **Assessment of cardiovascular system**

- Topography of the heart
- Examination of the precardium
- Overall cardiovascular functions
- Symptoms of cardiovascular disease

## **Segments of other Body System**

- Skin and extremities
- Neurological system
- Abdomen

## **Chest physical therapy**

- Definition, indication/Contraindication
- Techniques of chest physical therapy

## **Gas Physics**

- State of matter
- Temperature conversion
- Humidity
- Pressure measurement
- Gas flows and diffusion
- Gas laws
- Miscellaneous concepts such as density and specific gravity

## **Medical Gas supply**

- Compressed Gas Cylinders
- Color coding
- Cylinders and Cylinders valves
- Cylinder storage
- Diameter index safety system
- Medical gas pipeline system and station outlets
- Air components
- Oxygen concentrators
- Alarms and safety revises

**Gas Administration devices (Reducing valves, flow meters and regulators)**

- Simple oxygen administration devices
- Methods of controlling gas flow
- Reducing valve
- Flow meters
- Regulators
- Flow restrictors

**Oxygen therapy (rationale for oxygen therapy, precautions assessment of need and adequacy and therapy and the relevant devices)**

- Definition
- Humidity therapy
- Aerosol therapy
- Small volume nebulizer therapy - definition, physiological rationale

**ECG - basic principles, normal ECG, interpretation in disease**

**Chest Radiological Introduction, value and limitation of Conventional and Special views**

**Pulmonary function testing - Definition**

PFT - in disease and their significance

Provocative tests and post bronchodilator tests of lung function

**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 Introduction to Respiratory Care Technology shall be as given under.

<b>TYPE OF QUESTION</b>	<b>NUMBER OF QUESTIONS</b>	<b>MARKS</b>	<b>SUB-TOTAL</b>
<b>LONG ESSAY (LE)</b>	3 (To attempt 2)	2 x 10	20
<b>SHORT ESSAY (SE)</b>	14 (To attempt 12)	12 x 5	60
<b>SHORT ANSWER (SA)</b>	12 (To attempt 10)	10 x 2	20
<b>TOTAL MARKS</b>			100

**PRACTICAL EXAMINATION - 40 Marks**

# SUBSIDIARY SUBJECTS

## SOCIOLOGY

**Teaching Hours:** 20

### 1. 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. Various social factors affecting the family in rural and urban communities in India will be studied.

### 2. 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

### 3. Social Factors in Health and Disease

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

### 4. Socialization

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

### 5. Social Groups

- 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

### 6. 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
- Psychosomatic disease and their importance to physiotherapy

### 7. Community

- Rural community: Meaning and features
- Health hazards to rural communities
- Health hazards to tribal community
- Urban community - Meaning and features
- Health hazards of urban communities

### 8. Culture and Health

- Concept of Health
- Concept of Culture
- Culture and Health

- Culture and Health Disorders

### **9. 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

### **10. 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

### **11. Social Security**

- Social Security and social legislation in relation to the disabled

### **12. 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 term 'Constitution' making of the Indian Constitution 1946-1950

**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 Dalit's, 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, Allahabad, 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**

1. Sources, health hazards and control of environmental pollution
2. 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
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

### **REFERENCE BOOKS:**

#### **Environment Science & Health**

Text Book of Environmental Studies for under graduate courses By ErachBharucha Reprinted in 2006, Orient Longman Private Limited /Universities Press India Pvt

# **COURSE CONTENTS THIRD YEAR MAIN SUBJECTS**

## **PAPER –I RESPIRATORY CARE TECHNOLOGY – CLINICAL KNOWLEDGE**

The students should be able to describe:

1. Symptoms of respiratory diseases: cough, haemoptysis, dyspnoea, cyanosis.
2. Concept of disease, clinical evaluation and management of the following respiratory diseases:
  - a) Acute rhinitis.
  - b) Acute sinusitis.
  - c) Acute pharyngitis.
  - d) Laryngo trachiitis.
  - e) Epiglottitis.
3. Lower respiratory tract infection
  - a) Bronchitis.
  - b) Pneumonia: community acquired, hospital acquired, in immune compromised host.
  - c) Lung abscess.
  - d) Atypical pneumonia.
  - e) Common viral and fungal lower respiratory infections.
  - f) Pulmonary tuberculosis.
  - g) Tropical eosinophilia.
  - h) Acute obstructive pulmonary diseases and acute respiratory failure.
  - i) Pulmonary oedema.
  - j) Acute lung injury.
  - k) Toxic inhalation.
  - l) Bronchial asthma and other types of chronic obstructive pulmonary disease.
4. Oxygen therapy (rationale for oxygen therapy, precautions assessment of need and adequacy and therapy and the relevant devices)
  - a) Causes and responses to hypoxemia.
  - b) Clinical signs of hypoxemia.
  - c) Goals of oxygen therapy.
  - d) Oxygen therapy devices.
  - e) Hazards of oxygen therapy.

- f) Uses of humidification.
  - g) Possible causes of inadequate humidification.
  - h) Types of humidifiers (including active and passive methods of humidification).
  - i) Goals of aerosol therapy.
  - j) Hazards of aerosol therapy.
  - k) Assessment of aerosol therapy
  - l) Factors influencing aerosol deposition in the lungs.
  - m) Particle deposition.
  - n) Aerosol generators.
5. Nebulisers and metered dose inhaler.
- a) Types of nebulisers.
  - b) Aerosol output.
  - c) Small volume nebuliser therapy: definition, physiological rationale.
6. Gas analysers (oxygen, carbon dioxide).
- a) Gas analysis.
  - b) Transcutaneous oxygen monitors.
  - c) Pulse oximeters.
  - d) Capnography.
7. Manual Resuscitators.
- a) Types of resuscitator bags, bruits airway.
  - b) Indications.
  - c) Hazards.
8. Artificial air way (oral and nasal endotracheal tubes, tracheostomy tubes)
- a) Parts of airway and features.
  - b) Types sizes and method of insertion.
  - c) Indications for use
  - d) Care of long-term airway and complications.
  - e) Face masks: types, sizes and its usage.

## **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 Paper –I Respiratory Care Technology – applied shall be as given under.**

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

### **PRACTICAL EXAMINATION**

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

## **PAPER-II RESPIRATORY CARE TECHNOLOGY – APPLIED**

1. Principles of mechanical ventilation: airway resistance, lung compliance, dead space ventilation, ventilatory failure, oxygenation failure, clinical conditions leading to mechanical ventilation, operating modes of mechanical ventilation.
2. Monitoring in mechanical ventilation: concepts of monitoring, vital signs, chest inspection and auscultation, fluid electrolyte balance, arterial blood gases, oxygen and end tidal carbon dioxide monitoring.
3. Management of mechanical ventilation: strategies to improve ventilation, improve oxygenation, acid-base & electrolyte balance and their correction, fluid, electrolyte, nutrition balance and management.
4. Troubleshooting of ventilator alarms and events, care of the ventilation circuit, care of the artificial airway.
5. Pharmacotherapy for mechanical ventilation: drugs for improving ventilation, steroids, MDI medications, neuromuscular blocking agents like nitric oxide, propofol and anaesthetic gases.
6. Effect of PEEP: pulmonary considerations, effects on the cardiovascular system, haemodynamics, renal & neurological considerations.
7. Basic ventilator waveform analysis.
8. Haemodynamics monitoring: ECG, arterial catheter, CVP, pulmonary artery catheter, cardiac output and vascular resistance calculation, preload, after load contractility assessment, calculation of haemodynamic values, monitoring of mixed venous saturation.
9. Classification of mechanical ventilators: ventilator classification, ventilatory work, drive mechanism, control circuits, control variables, phase variables, output, waveform, alarm system.
10. Airway management in mechanical ventilation: intubation, common artificial airways,
11. intubation procedures, management of endotracheal and tracheostomy tubes, extubation, complications of the above.
12. Tracheostomy, mini tracheostomy, endotracheal intubation.
13. Humidification.

## **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 Paper – II Respiratory Care Technology- Applied shall be as given under.**

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

### **PRACTICAL EXAMINATION**

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

## **PAPER –III RESPIRATORY CARE TECHNOLOGY – ADVANCED**

1. Initiation of mechanical ventilation: indications, contraindication, initial ventilator settings, ventilator alarm settings, hazards and complications.
2. Weaning from mechanical ventilation: weaning and its failure, weaning criteria and indices, weaning procedure, signs, causes of weaning failure.
3. Neonatal mechanical ventilation: intubation and problems inherent to the neonate, surfactant replacement therapy, basic principles of neonatal ventilation, modes, initiation and maintenance, high frequency ventilation, liquid ventilation.
4. Clinical situations with case studies of mechanical ventilation and management.
5. Noninvasive positive pressure ventilation: introduction, terminology, indications, CPAP, bilevel PAP.
6. Home mechanical ventilation: goals, indications, patient selection, equipment selection.
7. Miscellaneous: barotraumas, transport during ventilation, hyperbaric therapy, Caissons disease and high-altitude sickness, sleep apnea and related disorders, drug over dosaging and poisoning requiring ventilation and their therapy, pulmonary edema, drowning, oxygen toxicity.

### **PRACTICAL EXERCISES:**

1. Interpretation and correction of a given arterial blood gas.
2. Interpretation and correction of a given electrolyte abnormality.
3. Calculation of body surface area, nutritional requirement and fluid electrolyte requirement.
4. Setting of ventilator for a given case.
5. Managing a simulated ventilatory accident circuit including disconnection, kinking of Tubes, recognition of various alarms etc.
6. Identification of various respiratory circuit components and their uses, method of Sterilization and complications related them.
7. Identification of drugs and their pharmacology
8. Calculating lung compliance, interpretation of a PFT and management.



### **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 Paper-III - Respiratory Care Technology**

**Advanced shall be as given under.**

<b>TYPE OF QUESTION</b>	<b>NUMBER OF QUESTIONS</b>	<b>MARKS</b>	<b>SUB-TOTAL</b>
<b>LONG ESSAY (LE)</b>	3 (To attempt 2)	2 x 10	20
<b>SHORT ESSAY (SE)</b>	14 (To attempt 12)	12 x 5	60
<b>SHORT ANSWER (SA)</b>	12 (To attempt 10)	10 x 2	20
<b>TOTAL MARKS</b>			100

### **PRACTICAL EXAMINATION**

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

# SUBSIDIARY SUBJECTS

## 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 skill in the use of basic statistical and research methodology

### 3. CONTENTS

#### **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,
- Cumulative frequency curve, ogive.
- Normal probability curve.

#### **Unit - III: Measure of Central Tendency**

- Need for measures of central tendency
- Definition and calculation of mean - ungrouped and grouped
- Meaning, interpretation and calculation of median ungrouped and grouped.33
- Meaning and calculation of mode.
- Comparison of the mean, and mode.
- Guidelines for the use of various measures of central tendency.

#### **Unit - IV: Measure of Variability**

- Need for measure of dispersion
- The range, the average deviation
- The variance and standard deviation
- Calculation of variance and standard deviation ungrouped and grouped
- Properties and uses of variance and SD

### **Unit -V: Probability and Standard Distributions**

- Meaning of probability of standard distribution
- The Binominal distribution
- The normal distribution
- Divergence from normality - skewness, kurtosis

### **Unit - VI: Sampling Techniques**

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

### **Unit - VII: Health Indicator**

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

### **RECOMMENDED BOOKS:**

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

# BASICS IN COMPUTER APPLICATIONS

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

## 1. 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
- Hardware and Software

## 2. 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

## 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. 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

# 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 Hippocraticoath, 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.