

**DHANALAKSHMI SRINIVASAN UNIVERSITY**  
**SAMAYAPURAM - 621112**



**SYLLABUS FOR BACHELOR OF SCIENCE IN RESPIRATORY THERAPY**

**HEALTH FOR ALL**

## Respiratory Therapy

### I YEAR

S.NO	NAME OF THE SUBJECTS	TOTAL HOURS ALLOTTED
1.	ANATOMY &PHYSIOLOGY	120 HOURS
2.	MICROBIOLOGY & PATHOLOGY	60 HOURS
3.	BIOCHEMISTRY& PHARMACOLOGY	60 HOURS
4.	BIO STATISTICS & PHYSICS	40 HOURS
5.	CLINICAL	1000 HOURS

### II YEAR

S.NO.	NAME OF THE SUBJECTS	TOTAL HOURS ALLOTTED
1.	RESPIRATORYDISEASES	40 HOURS
2.	CARDIOVASCULARDISEASES	50 HOURS
3.	DIAGNOSTIC TECHNIQUES IN CARDIO RESPIRATORY DISEASES	60 HOURS
4.	EQUIPMENTS INRESPIRATORY CARE	90 HOURS
5.	CLINICAL	1000 HOURS

### III YEAR

S.NO	NAME OF THE SUBJECTS	TOTAL HOURSALLOTTED
1.	RESPIRATORY THERAPY TECHNIQUES I	80 HOURS
2.	RESPIRATORYTHERAPY TECHNIQUES II	80 HOURS
3.	LIFE SUPPORTSYSTEM	80 HOURS
4.	CARDIO PULMONARY REHABILITATION	60 HOURS
5.	CLINICAL	1000 HOURS

The course shall be called as the “Bachelor of Science in Respiratory Therapy” It will be an Intensive full time course, which will include Bedside teaching, Classroom lectures and practical training in the Surgical Intensive Care Unit, Medical Intensive Care Unit, Neuro- Intensive Care Unit, High Dependency Unit, Coronary Care Unit, Cardio Thoracic Surgical Unit, Emergency, Respiratory Labs and Operation theaters.

At the end of the course the candidate will be fully trained in the Comprehensive Respiratory care of critically ill patients, which will include Assessment, Monitoring, Intubation, weaning, extubation and care of mechanically ventilated patients. They also will be trained in Pulmonary Function Testing, Advanced Cardio Respiratory physiotherapy, transportation of critically ill patients and Advanced Life Support system.

The evaluation will comprise theory, practical and VIVA examination at the end of each year, and the project submission at the end of third year.

## **SYLLABUS First Year:**

### **Basic Sciences Paper I: Anatomy and Physiology**

- Anatomy of the Upper and Lower airways
- Pleura, Lungs
- Surface marking of the lungs
- Broncho pulmonary segments
- Muscles of Respiration
- Diaphragm
- Nerve supply and Blood Supply of the respiratory system
- Transportation of gases- O<sub>2</sub>, CO<sub>2</sub>, and Dissociation curves
- O<sub>2</sub> cascade, O<sub>2</sub> flux, Lung volumes and Capacities
- Nervous and chemical control of Respiration. Gas exchange, Work of breathing, Resistance, compliance
- Anatomy of the heart, Pericardium
- Conducting system
- Cardiac cycle, cardiac output
- Nervous control of heart
- Cardiac rhythm, ECG
- Hemodynamics
- Blood pressure
- Auscultatory areas, Heart sounds
- Nerve supply and Blood Supply of the Cardiovascular system
- Neonatal and pediatric cardio respiratory anatomy and physiology, basic vitals and their significance
- Neurophysiology and stages of sleep

## **References Books:**

- Williams PL, Warwick R, Dyson M, Bannister LH (eds) Grey's Anatomy. 36<sup>th</sup> edition, Churchill Living stone, Newtork, 1980.
- B.D Chaurasia's, Human anatomy Regional and applied Volume – 1,3 CBS Publishers and distributions New Delhi, 1995.
- Arthur C Gyton, John E, Hall, Text book of Mrdical Physiology, 9<sup>th</sup>edition W.B.sounders company U.S.A 1996.
- Anil BaranSingamahapatra, Essentials of Medical Physiology, 1<sup>st</sup> edition current Books international Mumbai, 1998.
- Richard s. Snell, Clinical Anatomy for Medical students, 5<sup>th</sup> edition Little, Brown and company, U.S.A 1992.

## **Paper II : Microbiology and Pathology**

- Classification of microorganisms, size, shape, and structure of bacteria
- Microbiology - Eukaryotic pathogens involving respiratory tract
- Prokaryotic pathogens involving respiratory tract
- Mycobacterium and common gram negative bacteria
- Methods of sterilization and disinfection
- Disinfection of respiratory equipment's
- Infection control – Meaning, methods of transmission of diseases.
- Pathology - Cellular adaptation
- Cell Injury, Cell death
- Causes of Cell injury
- Reversible and Irreversible cell injury
- Examples of cell injury and necrosis
- Acute and chronic inflammation, General features of inflammation
- Systemic pathology - blood vessels, lymphatic and veins
- Lungs – Congenital anomalies, Obstructive and Restrictive pulmonary diseases, diseases of Pleura.

## Reference Books:

1. Text book of Microbiology by Anantha Narayanan & Jeyaram Panickar

### **Paper III Biochemistry and Pharmacology**

- Carbohydrate, Protein, Fat – Structure, Synthesis, Metabolism and sources
- Vitamins, Minerals – Functions
- Chemistry of Respiration
- Acid base balance and Imbalance
- Enzymes and Hormones functions
- Biochemical Genetics, Inborn errors of metabolism
- General information about drug administration
- Bronchodilators and xanthenes
- Expectorants, Mucolytics and antihistamines
- Corticosteroids and anti infective agents
- Diuretics and anti hypertensive agents
- Neuromuscular blocking agents
- Sedatives and analgesic
- Pharmacodynamics and pharmacokinetics
- Local anaesthetic agents
- Adrenergic agents – Adrenaline, Nor adrenaline, Dopamine,

# Vasopressin

## **Reference Books**

1. Text book of pathology by Harshmohan
2. Text book of Biochemistry by Ambika Shanmugam



## **Paper IV Bio statistics and Physics**

- Introduction: Concepts, Types, significance and scope of statistics, Meaning data, sample, parameter, type and level of data and their measurement organization and presentation of data – Tabulation of data, Frequency distribution Graphical and tabular presentation.
- Measures of central tendency: Mean, Median, Mode
- Measures of variability: Range, Percentiles, Average deviation, Quartile deviation, Standard deviation.
- Normal distribution: Probability, characteristics and application of normal probability curve, sampling error.
- Measures of relationship: Correlation- need and meaning rank order correlation, Scatter diagram method, Product moment correlation, simple linear regression analysis and prediction.
- Significance of statistic and significance between two statics (Testing hypothesis)
- Non parametric test- chi-square test, sign, median test, Mann-Whitney test.
- Parametric test - 't' test, ANOVA, MANOVA, ANCOVA and reliability tests.
- Gas Physics – States of matter and Gas laws,
- Gas flows and diffusion, Pressure moments

- Factors affecting Oxygenation and ventilation
- Medical terminologies used in common practices, drugs

### Epidemiology, Biostatistics and Medical ethics

- Applied Physics and medical terminologies
- Working principle of Venturi Mask
- Nebulizer – ultrasonic and Jet
- Spirometer, lung volume measurements, DLCO APTS to BTPS Pulse oximeter, Capnography Oxygen flow meter and cylinders
- CPAP, BiPAP and Ventilator plus

### **Reference Books:**

1. Text book of Biostastics by SP Gupta
2. The text Book of Biostatistics by L hance
3. Text book of biophysics and Biochemistry by Randawa and Christober

## **Second Year**

### **Paper I Respiratory Diseases**

- Assessment & Classification of Pulmonary diseases
- Hypoventilation & Hyperventilation
- Diffusion Defects, Acid Base Disorders
- Ventilation & Perfusion Abnormalities
- Airway diseases - COPD (Chronic Obstructive Pulmonary Diseases), Asthma, Chronic Bronchitis, Emphysema, Bronchiectasis and their management
- Restrictive lung diseases – Interstitial lung disease, chest wall and spine deformities
- Asthma and Management
- Chronic Bronchitis and Management
- Emphysema and Management
- Bronchiectasis and management
- Acute chest trauma, Pulmonary fibrosis
- Atelectasis and pulmonary collapse
- Acute Respiratory distress Syndrome
- Ventilator Associated Pneumonia

- Community Acquired Pneumonia, Hospital acquired pneumonia(HAP)
- Interstitial Lung disease
- Neuromuscular disorders (GBS, Myasthenia Gravis) and Management
- Pulmonary embolism and management
- Pulmonary Tuberculosis and management
- Pleural diseases – Pneumothorax, Pleural effusion, Empyema
- Lung cancer
- Sleep disordered breathing- Obstructive sleep apnea (OSA), Obesity hypoventilation syndrome (OHS)

### **Reference Books:**

- George Mathew.K Medicine Prep manual 1<sup>st</sup> edition. B.I Churchill Livingstone Pvt Ltd. New delhi1995
- Scot Irwin, Jan Stephen tecklin, Cardiopulmonary Physical therapy, a guide to practice, 3<sup>rd</sup> edition, mosby, USA.
- Donna Frownfelter, Elizabeth Dean (eds) Principles and practices of cardiopulmonary physical therapy, 3<sup>rd</sup> Mosby, USA.
- Craig L, Scanlan, Egan’s Fundamentals of Respiratory care, 6<sup>th</sup> edition Mosby,1995.
- Stevansadowsky, H Ellan, A Hillegas, Essential of Cardiopulmonary physical therapy, W.B saunders company USA.
- John F Murray, Jay A Nadel, Text book of Respiratory Medicine, 2<sup>nd</sup> edition W.B saunders company USA.

- Braunwald (edr), Heart disease, A text book or cardiovascular medicine, 4<sup>th</sup> edition, W.B saunders company, USA 1992.
- Shoemaker, Ayres, Greenvik, Holbrook, Text book of critical care, 4<sup>th</sup>edition, W.B saunders company 1984

## **Paper II Cardiovascular Diseases**

- Shock - Cardiogenic
- Heart Failure
  - Systolic Failure
  - Diastolic Failure
  - Right ventricular Failure
- Acute left ventricular failure
- Pulmonary edema
- Pulmonary hypertension
- Pulmonary embolism
- Ischemic heart disease
- Myocardial ischemia and Infarction
- Valvular Heart Disease
  - Mitral Stenosis
  - Mitral Regurgitation
- Endocarditis
- Myocarditis and Cardiomyopathy
- Pericardial disease-Pericarditis, Pericardial effusion and tamponade
- Congenital Heart Diseases
  - TOF
  - Atrial Septal Defect
  - Ventricular Septal Defect

- Patent Ductus Arteriosus
  
- Arrhythmias
  - Tachy Arrhythmias
  - Brady Arrhythmias

**Reference Books:**

- George Mathew.K Medicine Prep manual 1<sup>st</sup> edition. B.I Churchill Livingstone Pvt Ltd. New delhi1995
- Scot Irwin, Jan Stephen tecklin, Cardiopulmonary Physical therapy, aguide to practice, 3<sup>rd</sup> edition, mosby, USA.
- Donna Frownfelter, Elizabeth Dean (eds) Principles and practices ofcardiopulmonary physical therapy, 3<sup>rd</sup> Mosby, USA.
- Craig L, Scanlan, Egan’s Fundamentals of Respiratory care, 6<sup>th</sup> editionMosby,1995.
- Stevansadowsky, H Ellan, A Hillegas, Essential of Cardiopulmonary physical therapy, W.B saunders company USA.
- John F Murray, Jay A Nadel, Text book of Respiratory Medicine, 2<sup>nd</sup>edition W.B saunders company USA.
- Braunwald (edr), Heart disease, A text book or cardiovascular medicine, 4<sup>th</sup> edition, W.B saunders company, USA 1992.
- Shoemaker, Ayres, Greenvik, Holbrook, Text book of critical care, 4<sup>th</sup>edition, W.B saunders company 1984.

### **Paper III : Diagnostic Techniques in Cardio - Respiratory Diseases**

- Arterial Blood Gas interpretation
- Pulse oximetry
- Capnography
- Systematic interpretation of chest x-ray
- Pulmonary function Test
  - DLCO
  - FRC
  - Spirometry
  - Respiratory
  - drive
  - FeNO
- Ventilator Graphy
- Sleep Study-Polysomnography, Limited channel study, PAP titration
- Body Plethysmography
- ECG interpretation
- Echo Cardio Graphy
- Treadmill Test
- CT / MRI - Chest



## **Paper IV Equipments in Respiratory Care**

- Medical gas and Medical Gas Pipelines
- Oxygen Flow meters
- Humidifiers
  - Heat & Moisture ExchangerHeated
  - Humidifier
- Defibrillators
- Capnography
- Pulse Oximeter
- Cuff Pressure manometer
- Peak Expiratory flow meter
- AMBU, BAINS circuit
- Spirometer
- Artificial airways – Basic & Advanced
- Various routes of O2 administration
- Aerosol therapy
- Nebulizer – Jet, Ultrasonic
- ICD System
- NIV
- Ventilator
- O2 Analyser
- Laryngoscope, Bronchoscope
- Ultrasound

## **Third Year**

### **Paper I Respiratory Therapy Techniques I**

- Mechanical Ventilation
  - Initiation of Mechanical ventilation
  - Modes of mechanical ventilation
  - Different types of ventilation
  - Monitoring during mechanical ventilation
  - Care of patients with mechanical ventilation
  - Troubleshooting during mechanical ventilation
  - Complications during mechanical ventilation
  - Weaning during mechanical ventilation
  - PEEP, Auto PEEP
  - Weaning criteria
  - Post extubation care
  - Lung recruitment maneuvers
  - Prone Ventilation
  
- Non Invasive mechanical ventilation- Continuous positive airway pressure (CPAP), Bi-level positive airway pressure (BiPAP)
  - Indication
  - Contra indication
  - Modes
  - Monitors
  - Complication

## **Paper II Respiratory Therapy Techniques II**

- Oxygen therapy
  - High flow oxygen therapy
  - Low flow oxygen therapy
  - Aerosol Therapy
  - Indication
  - Procedure
  - Complication
- Humidification
  - Different types of humidification
  - HME filter vs. heated humidifier
  - Suctioning method
  - Indication
  - Contraindication
  - Types
  - Procedure
  - Complication
- Intercostal drainage(ICD) – Indications, Procedure, complications ICD bottle system
- Endo tracheal tube intubation
  - Indication
  - Route of intubation

- Difficult intubation
- Complications
- Care of tracheostomy patients
- Transport of Critically ill patients
- Extra Corporeal Membrane Oxygen (ECMO) Therapy
- Respiratory Monitoring: Compliance, Resistance, Volumes, Pressures, respiratory muscle strength assessment, maximum inspiratory and expiratory pressures
- Cardiovascular monitoring: Invasive and Non invasive BP monitoring
- Central nervous system monitoring: Glasgow coma scale, AVPU scale, sedation and analgesia scoring

## **Paper III Life Support System**

- Basic Life Support
  - Recognition of Cardiac arrest
  - Respiratory arrest
  - AED
  - Lay rescuer Resuscitation
- Advanced Cardiac Life support
  - Tachyarrhythmia
  - Bradyarrhythmia
  - Pulse less arrest
  - Difference between Synchronized Cardio version / Defibrillation
- Advanced Trauma Life support
- Primary Survey
  - A, B, C, D, E
- Secondary Survey
  - Head-to-toe evaluation
  - Complete history and physical examination
  - Reassessment of all vital signs
  - Post resuscitation care and monitoring

## **Paper IV Cardio Pulmonary Rehabilitation**

### Pulmonary Rehabilitation

- Definition and Aims
- Selection of patients
- Pulmonary rehabilitation team
- Structure of Pulmonary rehabilitation
- Patient assessment for pulmonary rehabilitation
- Assessment of dyspnoea

### Definition

- Exertional breathlessness – modified Borg scale, Visual analogue scale.
- Breathlessness associated with activities – modified Medical Research Council scale
- Assessment of exercise performance – Field tests  
Self paced – the six - minute walk test
- Externally paced – the incremental shuttle walk test  
Assessment of exercise performance – Laboratory test
- Incremental exercise testing – Cardiopulmonary exercise testing  
Indications and contra indications
- Assessment of quality of life  
Definition
- Questionnaire measures of health – related quality of life
- Assessment of anxiety and depression
- Hospital anxiety and depression questionnaire
- Bronchial hygiene therapy

- Broncho – pulmonary segments
- Surface anatomy of lung Postural drainage
- Chest percussion
- Forced expiratory technique
- Positive airway pressure adjuncts
- Acapella
- Flutter

Calculations:

- Drug dose calculations
- Infusion calculations
- Gas cylinder calculations
- Flow calculations
- Lung volumes and capacities

Respiratory Therapy

**Posting duration during internship**

Period of Internship: 12 months

Posting	Duration
HDU/ ICU and ward	3 months
Pulmonary function lab	2 months
Bronchoscopy suite	2 months
Pulmonary rehabilitation	2 months
Sleep lab	2 months
Outpatient department	1 month

## **Scheme of Examination**

Examinations will be held at the end of every year

### **First year: Basic Sciences**

<b>Theory Subject Title</b>	<b>University Theory Exam</b>		<b>Practical Marks</b>		<b>VIVA</b>		<b>IA</b>	
	Max	Min	Max	Min	Max	Min	Max	Min
Anatomy & Physiology	100	50	100	50	50	25	50	25
Microbiology & Pathology	100	50	100	50	50	25	50	25
Biochemistry & Pharmacology	100	50	100	50	50	25	50	25
Bio Statistics & Physics	100	50	100	50	50	25	50	25



## Second Year: Cardio Respiratory Diseases and Respiratory Management

Theory Subject Title	University Theory Exam		Practical Marks		VIVA		IA	
	Max	Min	Max	Min	Max	Min	Max	Min
Respiratory Diseases	100	50	100	50	50	25	50	25
Cardiovascular Diseases	100	50	100	50	50	25	50	25
Diagnostic Techniques in Cardio Respiratory Diseases	100	50	100	50	50	25	50	25
Equipments In Respiratory Care	100	50	100	50	50	25	50	25

**Third Year: Respiratory Therapy Management and Cardiopulmonary Rehabilitation**

Theory Subject Title	University Theory Exam		Practical Marks		VIVA		IA	
	Max	Min	Max	Min	Max	Min	Max	Min
Respiratory Therapy Techniques I	100	50	100	50	50	25	50	25
Respiratory Therapy Techniques II	100	50	100	50	50	25	50	25
Life Support System	100	50	100	50	50	25	50	25
Cardio Pulmonary Rehabilitation	100	50	100	50	50	25	50	25

**Question pattern**

The Theory Examinations will be for 100 marks with the following components.

	No. of questions	Marks per question	Total Marks
Essays	3	10	30
Short Notes	8	5	40
Short Answers	10	3	30
	<b>Total</b>		<b>100</b>