PROPOSED REGULATIONS, SYLLABUS AND EXAMINATION PATTERN FOR THE B.Sc (RESPIRATORY THERAPY) Under The Tamil Nadu Dr. MGR Medical University, Chennai.

Bachelor of Science in Respiratory Therapy

Course Title and Summary

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- O2, CO2, and Dissociation curves
- O2 cascade, O2 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.

References Books :

- Williams PL, Warwick R, Dyson M, Bannister LH (eds) Grey's Anatomy. 36th 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, 9thedition W.B.sounders company U.S.A 1996.
- Anil BaranSingamahapatra, Essentials of Medical Physiology, 1st edition current Books international Mumbai, 1998.
- Richard s. Snell, Clinical Anatomy for Medical students, 5th 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
- Bronchodialtors and xanthines
- Expectorants, Mucolytics and antihistamines
- Corticosteroids and anti infective agents
- Diuretics and anti hypertensive agents
- Neuromuscular blocking agents
- Sedatives and analgesics
- Pharmacodynamics and pharmacokinetics

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-sqaure 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

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
- COPD (Chronic Obstructive Pulmonary Diseases)
- 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
- Interstitial Lung disease
- Neuromuscular disorders (GBS, Myasthenia Gravis) and Management
- Pulmonary embolism and management
- Pulmonary Tuberculosis and management

Reference Books :

- George Mathew.K Medicine Prep manual 1st edition. B.I Churchill Livingstone Pvt Ltd. New delhi1995
- Scot Irwin, Jan Stephen tecklin, Cardiopulmonary Physical therapy, a guide to practice, 3rd edition, mosby, USA.
- Donna Frownfelter, Elizabeth Dean (eds) Principles and practices of cardiopulmonary physical therapy, 3rd Mosby, USA.
- Craig L, Scanlan, Egan's Fundamentals of Respiratory care, 6th 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, 2nd edition W.B saunders company USA.
- Braunwald (edr), Heart disease, A text book or cardiovascular medicine, 4th edition, W.B saunders company, USA 1992.
- Shoemaker, Ayres, Greenvik, Holbrook, Text book of critical care, 4th 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 Infarction
- Valvular Heart Disease
    - Mitral Stenosis
    - Mitral Regurgitation
- Endocarditis
- Myocarditis and Cardiomyopathy
- 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 1st edition. B.I Churchill Livingstone Pvt Ltd. New delhi1995
- Scot Irwin, Jan Stephen tecklin, Cardiopulmonary Physical therapy, a guide to practice, 3rd edition, mosby, USA.
- Donna Frownfelter, Elizabeth Dean (eds) Principles and practices of cardiopulmonary physical therapy, 3rd Mosby, USA.
- Craig L, Scanlan, Egan's Fundamentals of Respiratory care, 6th 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, 2nd edition W.B saunders company USA.
- Braunwald (edr), Heart disease, A text book or cardiovascular medicine, 4th edition, W.B saunders company, USA 1992.
- Shoemaker, Ayres, Greenvik, Holbrook, Text book of critical care, 4th edition, W.B saunders company 1984

Paper III : Diagnostic Techniques in Cardio - Respiratory Diseases

- Arterial Blood Gas interpretation
- Pulseoximetry
- Capnography
- Systematic interpretation of chest x-ray
- Pulmonary function Test
    - DLCO
    - FRC
    - Spirometry
- Ventilator Graphy
- Sleep Study
- Body Plethismography
- ECG interpretation
- Echo Cardio Graphy
- Treadmill Test
- CT / MRI - Chest

Paper IV Equipments in Respiratory Care

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

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
  - 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 vs. heated humidifier

Suctioning method

- Indication
- Contraindication
- Procedure
- Complication

Intercostal drainage - Insertion, complication

Endo tracheal tube intubation

- Indication
- Route of intubation
- Difficult intubation
- Complication

Transport of Critically ill patients

Extra Corporeal Membrane Oxygen (ECMO) Therapy

Paper III Life Support System

Basic Life Support

- Recognition of Cardiac arrest
- Respiratory arrest
- AED
- Lay rescuer Resuscitation

Advanced Cardiac Life support

- Tachyarrhythmia
- Bradyarrythmia
- Pulseless 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

Paper IV Cardio Pulmonary Rehabilitation

- Pulmonary Rehabilitation
  - Definition and Aims
  - Benefits of pulmonary rehabilitation
  - Selection of patients
  - Patient assessment for pulmonary rehabilitation
  - Assessment of dyspnea
  - Quality of life
  - Pulmonary rehabilitation team
  - Structure of pulmonary rehabilitation
- Cardiac Rehabilitation
  - Goals
  - Cardiac rehabilitation team
  - Rationale for cardiac rehabilitation

Scheme of Examination

Examinations will be held at the end of every year (Three Year Course)

First year : Basic Sciences

Theory Subject Title	University Theory Exam		Practical Marks		VIVA		IA	
	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
	Total		100