MALLA REDDY VISHWAVIDYAPEETH
(Deemed to be University)

SCHOOL OF ALLIED HEALTH SCIENCES AND TECHNOLOGY

MALLA REDDY VISHWAVIDYAPEETH

Suraram X Roads,
Jeedimetla, Hyderabad-
500055

Website: https://mrvv.edu.in/

Program: BACHELOR OF SCIENCE (B.Sc.)

Respiratory Technology

COURSE STRUCTURE

2026

Vision

To produce competent respiratory technologists who provide advanced respiratory care, improve patient outcomes, and contribute to research and critical care services.

Mission

Provide quality education, clinical training, research skills, and ethical respiratory care practices to manage cardiopulmonary disorders effectively.

Program Educational Objectives (PEOs)

Graduates will:

• Apply respiratory care knowledge in clinical practice
• Perform respiratory diagnostic procedures accurately
• Manage mechanical ventilation and critical care support
• Conduct research and evidence-based practice
• Work ethically and professionally in healthcare settings
• Improve patient care through advanced respiratory therapy

Program Outcomes (POs)

Students will:

• Understand respiratory anatomy, physiology, and pathology
• Assess respiratory conditions using diagnostic tools
• Perform ABG analysis, spirometry, and pulmonary function tests
• Operate and manage mechanical ventilators safely
• Apply airway clearance and oxygen therapy techniques
• Analyze clinical and laboratory data effectively
• Communicate professionally with healthcare teams and patients
• Follow medical ethics and patient safety principles
• Use modern respiratory care equipment and technologies
• Participate in research and lifelong learning

Program Specific Outcomes (PSOs)

Students can:

• Assess and manage respiratory disorders clinically
• Perform pulmonary diagnostic investigations
• Handle ICU ventilators and critical care equipment
• Provide emergency and trauma respiratory support
• Conduct respiratory care education and counseling
• Participate in clinical and community-based respiratory research

Program Specific Outcomes (PSOs)

Students can:

• Assess and manage respiratory disorders clinically
• Perform pulmonary diagnostic investigations
• Handle ICU ventilators and critical care equipment
• Provide emergency and trauma respiratory support
• Conduct respiratory care education and counseling
• Participate in clinical and community-based respiratory research

Course Outcomes (COs)

Students will:

• Understand concepts of mechanical ventilation
• Interpret arterial blood gas (ABG) results accurately
• Perform spirometry and pulmonary function testing
• Apply ventilator settings and troubleshooting methods
• Assess lung volumes and diffusion studies
• Understand sleep studies and polysomnography
• Develop critical care and patient monitoring skills
• Apply infection control and patient safety practices
• Improve practical, communication, and counseling skills

I^st Year I^st Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P/CL	C	MARKS		
							INT	EXT	TOTAL
1	RTY101	Human Anatomy & Histology	2	1	1	4	30	70	100
2	RTY102	Human Physiology	2	1	1	4	30	70	100
3	RTY103	Biochemistry for Health Sciences	2	1	1	4	30	70	100
4	RTY104	Communication Skills & Health Informatics	2	1	1	4	30	70	100
5	RTY105	Medical Terminology & Documentation	2	1	1	4	30	70	100
6	RTVAC001	Professional values, ethics	1	0	0	1	-	-	-
Total			10	5	5	21	150	350	500

Ist Year IInd Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	CL	C	MARKS		
								INT	EXT	TOTAL
1	RTY201	Community Health & Preventive Medicine	2	2		0	4	30	70	100
2	RTY202	Medical Microbiology	2	1		1	4	30	70	100
3	RTY203	Behavioral Sciences & Clinical Psychology	2	1		1	4	30	70	100
4	RTY204	Patient Assessment & Contact Techniques (T&P)	2	2	1	3	8	30	70	100
5	RTVAC002	Health and wealth being	1	0	0	0	1	-	-	-
Total			9	6	1	5	21	120	280	400

II nd Year III rd Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	CL	C	MARKS		
								INT	EXT	TOTAL
1	RTY301	Applied Pathology	2	1	1	0	4	30	70	100
2	RTY302	Pharmacology for Respiratory Care	2	1	1	0	4	30	70	100
3	RTY303	Pulmonary Diseases – I	2	1	1	0	4	30	70	100
4	RTY304	Fundamentals of Respiratory Care (T&P)	3	1	1	3	8	30	70	100
5	RTVAC003	Stress Management	1	0	0	0	1	-	-	-
Total			10	4	4	3	21	120	280	400

II nd Year IV th Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	CL	C	MARKS		
								INT	EXT	TOTAL
1	RTY401	Pulmonary Diseases – II	2	1	1	0	4	30	70	100
2	RTY402	Diagnostic & Therapeutic Procedures in Respiratory Care (T&P)	1	1	1	0	3	30	70	100
3	RTY403	Principles of Mechanical Ventilation – I (T&P)	2	1	1	0	4	30	70	100
4	RTY404	Applied Cardiopulmonary Anatomy & Physiology	2	1	0	0	3	30	70	100
5	RTY405	Clinical Practicum I	0	0	1	5	6	30	70	100
6	RTVAC 004	Environmental Awareness	1	0	0	0	1	-	-	-
Total			8	4	4	5	21	150	350	500

III rd Year V th Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	CL	C	MARKS		
								INT	EXT	TOTAL
1	RTY501	Biostatistics, Research Methodology & Ethics	2	1	0	0	3	30	70	100
2	RTY502	Critical Care & Advanced Cardiothoracic Respiratory Care (with ACLS)	3	2	0	1	6	30	70	100
3	RTY503	Neonatal & Pediatric Respiratory Care	2	2	1	1	6	30	70	100
4	RTY504	Clinical Practicum II	0	0	2	4	5	30	70	100
5	RTVAC005	Interpersonal communication	1	0	0	0	1	-	-	-
Total			8	5	2	6	21	120	280	400

III Year[rd] VI Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	CL	C	MARKS		
								INT	EXT	TOTAL
1	RTY601	Principles of Mechanical Ventilation – II (T&P)	3	0	1	0	5	30	70	100
2	RTY602	Pulmonary Rehabilitation & Sleep Medicine	3	0	1	1	6	30	70	100
3	RTY603	Research Project / Dissertation	1	0	0	1	3	30	70	100
4	RTY604	Clinical Practicum III	0	0	1	5	6	30	70	100
Total			7	0	3	7	20	120	280	400

IV[th] Year VII[th] Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	CL		MARKS		
							C	INT	EXT	TOTAL
1	RTY701	Internship – Phase I (7th Semester)	0	0	0	720	18	-	-	-

IVth Year VIIIth Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	CL		MARKS		
							C	INT	EXT	TOTAL
1	RTY701	Internship – Phase I (7th Semester)	0	0	0	720	18	-	-	-

1.1 Undergraduate Programme

Sl. No.	Course	Duration	Eligibility for Admission
1	B.Sc Respiratory Therapy Technology	4 years	10+2 or equivalent

Medium of Instruction

English shall be the medium of instruction for all subjects of study and for examinations.

Duration of the Course

Duration details are mentioned under clause no. 1.1 of this booklet.

Examination Regulations

Attendance

75% of attendance (physical presence) is mandatory.
Medical leave or other types of sanctioned leaves will not be counted as physical presence.
Attendance will be counted from the date of commencement of the session to the last day of the closing of attendance before the final examination.

Internal Assessments

a) Regular periodic assessment shall be conducted throughout the course. In each semester, there will be two one-hour internal assessments (10 marks each) and a continuous assessment (10 marks). Thus, a total of 30 marks for the internal exam (i.e., weightage for internal assessment shall be 30% of the total marks in each subject).

b) Exam pattern for internal assessment in each semester will be:

- Short questions – 3 numbers out of which the student should write any 2 questions, each carrying 5 marks (i.e., 2 × 5 = 10 marks). Two such internal examinations will be conducted.
- Continuous assessment of the student will be done. Students' overall attendance, performance in class, behaviour, assignments, seminars, clinical postings, practical skills, and extra-curricular activities will be assessed. Continuous assessment carries 10 marks.

c) Thus, a total of 30 marks for the internal examination (10 + 10 + 10 = 30 marks). A candidate should secure a minimum of 40% marks in the internal assessment in each subject to be eligible to appear for the University examination.

d) For value-added courses, only an internal examination will be conducted. The assessment shall comprise five assignments/presentations/case presentations, each carrying 10 marks (i.e., 5 × 10 = 50 marks). Final examination will be for 50 marks with 5 questions each carrying 10 marks (5 × 10 = 50 marks). The minimum pass is 40% marks.

University Examinations (External)

a) University Examination shall be conducted at the end of every semester.

b) A candidate who satisfies the requirement of attendance and internal assessment marks, as stipulated by the University, shall be eligible to appear for the University Examination.

c) Examination will be of 3 hours duration (for theory). The question pattern for subjects without practical examination (70 marks) will be:

- Three essay questions out of which the student should answer any 2 questions, each carrying 10 marks (i.e., 2 × 10 = 20 marks)
- Eight short note questions out of which the student should attempt any 6 questions, each carrying 5 marks (6 × 5 = 30 marks)
- Ten very short questions each carrying 2 marks (10 × 2 = 20 marks)

Thus, a total of 70 marks.

d) The question pattern for practical examination shall include:

- Spotters
- Major practical
- Minor practical
- Viva voce
- Practical record

Passing Criteria

The minimum pass for the internal assessment is 40% and for the University Examination is 50%.

A student should secure an aggregate of 50% marks (adding internal and external examination marks together) to pass in each subject.

I^st Year I^st Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P/CL	C	MARKS		
							INT	EXT	TOTAL
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2	RTY102	Human Physiology	2	1	1	4	30	70	100
3	RTY103	Biochemistry for Health Sciences	2	1	1	4	30	70	100
4	RTY104	Communication Skills & Health Informatics	2	1	1	4	30	70	100
5	RTY105	Medical Terminology & Documentation	2	1	1	4	30	70	100
6	RTVAC001	Professional values, ethics	1	0	0	1	-	-	-
Total			10	5	5	21	150	350	500

RTY101-HUMAN ANATOMY & HISTOLOGY

L	T	P	C
2	1	1	4

Course Objectives

- At the end of the course, the student will be able to:
- Describe the gross and microscopic anatomy of various human body systems.
- Identify structures relevant to respiratory and cardiovascular functions.
- Correlate anatomical features with clinical and radiological applications.
- Recognize histological characteristics of major tissues and organs.

THEORY

UNIT I

General Anatomy & Musculoskeletal System **(20 Hours)**

- **The Human Body as a Whole**
  - Definition
  - Subdivisions
  - Anatomical positions
  - Fundamental planes
  - Vertebrate structure
  - Organization of body cells & tissues
- **Locomotion and Support**
  - Skeletal system
  - Bone classification
  - Skull (foramen magnum, maxilla)
  - Axial & appendicular skeleton
  - Joints & movements
- **Muscles**
  - Classification
  - Structure
  - Muscles of respiration
  - Diaphragm
  - Head, neck, and abdominal wall

- **Thorax**
  - Thoracic cavity & wall
  - Mediastinum
  - Thoracic duct
  - Surface markings
  - Clinical anatomy

UNIT II

Nervous System & Special Senses **(20 Hours)**

- **Anatomy of Nervous System**
  - Divisions of CNS & PNS
  - Spinal cord & reflex arc
  - Spinal nerves
- **Brain**
  - Gross features
  - Divisions (forebrain, midbrain, hindbrain)
  - Meninges
  - Blood supply
  - Spinal cord
  - Clinical anatomy
- **Special Senses**
  - Eye – structure & clinical anatomy
  - Ear – structure & clinical anatomy
  - Skin – structure & clinical anatomy
- **Genetics**
  - Chromosomes
  - Karyotyping
  - Chromosomal anomalies

UNIT III (20 Hours)

Cardiovascular & Respiratory System

Anatomy of Cardiovascular System

- Heart
- Chambers
- Valves
- Conduction system
- Coronary arteries
- Pericardium
- Cardiac cycle
- Innervation

- **Great Vessels**
  - Arteries
  - Veins
  - Aorta
  - SVC
  - IVC
  - Pulmonary circulation
  - Lymphatic drainage
- **Anatomy of Respiratory System**
  - Nose
  - Pharynx
  - Larynx
  - Trachea
  - Bronchial tree
  - Lungs
  - Alveoli
  - Pleura
- **Organization of Respiratory System**
  - Muscles of respiration

- Gross structure of lungs
- Pleural coverings
- Pulmonary vessels
- Nerve supply

UNIT IV **(10 Hours)**

Excretory & Reproductive System

Excretory System

- Kidney
- Ureter
- Bladder
- Urethra
- Blood & nerve supply
- Applied anatomy

- **Male & Female Reproductive System**
  - Male: testis, ducts, prostate
  - Female: ovary, uterus, vagina, accessory organs

UNIT V **(10 Hours)**

Endocrine & Lymphatic System

Endocrine System

- Pituitary
- Thyroid
- Parathyroid
- Adrenal
- Pancreas
- Gonads
- Location, hormones & function

- **Lymphatic Organs**
  - Tonsil
  - Spleen
  - Thymus

- Structure
- Function
- Applied anatomy

PRACTICALS / DEMONSTRATIONS **(10 hours)**

- **General Slides**
  - Hyaline cartilage
  - Fibro-cartilage
  - Elastic cartilage
  - Bone (T.S. & L.S.)
  - Blood vessels
  - Lymphoid tissues
  - Epithelial muscle
  - Skeletal muscle
  - Cardiac muscle
  - Peripheral nerve
- **Systemic Slides**
  - GIT
  - Lung parenchyma
  - Kidney
  - Pituitary gland
  - Adrenal gland
  - Thyroid gland
  - Parathyroid gland
  - Pancreas
  - Reproductive organs
- **Demonstrations**
  - Bone & joint identification
  - Brain & spinal cord
  - Heart & vessels
  - Diaphragm

- Lungs (histology & X-rays)
- Kidney
- Spleen
- Liver
- Pancreas

Learning Outcomes

• Identify the structure and organization of human tissues and organs.

• Explain functional anatomy of the thorax and respiratory system.

• Relate anatomical knowledge to clinical and diagnostic practice.

• Recognize microscopic structures under the microscope.

L	T	P	C
2	1	1	4

RTY102-HUMAN PHYSIOLOGY

UNIT I

(Hours: 16)

Blood and Body Fluids

1. Blood Composition

- Composition of blood
- Properties and functions of blood

2. Red Blood Cells

- Structure of RBC
- Hemoglobin
- Erythropoiesis
- Functions of RBCs

3. White Blood Cells

- Types and functions
- Life span
- WBC count

4. Platelets

- Structure and function
- Clotting time

5. Plasma Proteins

- Types
- Functions

6. Blood Grouping

- ABO blood groups
- Rh factor
- Inheritance
- Clinical significance

7. Blood Transfusion

- Cross matching
- Complications

- Rh incompatibility

8. Anemia

- Classification
- Causes
- Treatment

9. ESR and PCV

- Determination
- Significance

10. Blood Volume and Body Fluids

- Regulation of blood volume
- Composition of body fluids

11. Hemostasis

- Clotting mechanism
- Clotting factors
- Bleeding disorders

UNIT II (Hours: 17)

Cardiovascular and Muscle Physiology

1. Cardiovascular System

- Cardiac muscle physiology
- Cardiac cycle
- Cardiac output
- Heart rate
- Conducting system of heart

2. Cardiovascular Regulation

- Local regulation
- Systemic regulation
- Baroreceptors
- Circulation through organs

3. Electrocardiography (ECG)

- Basics of ECG
- ECG waves and intervals
- Normal ECG
- Abnormal ECG interpretation

4. Muscle and Nerve Physiology

- Action potential
- Neuromuscular junction
- Muscle tone
- Muscle fatigue

UNIT III (Hours: 27)

Respiratory Physiology

1. Functional Anatomy of Respiratory System

- Respiratory passages
- Alveoli and lungs

2. Mechanics of Respiration

- Inspiration and expiration
- Respiratory muscles
- Intrapleural and alveolar pressure

3. Lung Volumes and Capacities

- Tidal volume
- Inspiratory reserve volume
- Expiratory reserve volume
- Residual volume
- Vital capacity
- Total lung capacity

4. Pulmonary Ventilation

- Compliance
- Airway resistance
- Work of breathing

5. Gas Exchange and Transport

- Diffusion of gases
- Oxygen transport
- Carbon dioxide transport
- Oxygen dissociation curve

6. Regulation of Respiration

- Neural regulation
- Chemical regulation
- Respiratory centers

7. Ventilation–Perfusion Ratio

- V/Q ratio
- Physiological shunt and dead space

8. Applied Respiratory Physiology

- Hypoxia
- Cyanosis
- Artificial respiration
- Respiratory failure

UNIT IV (Hours: 14)

Nervous, Endocrine and Special Senses Physiology

1. Endocrine System

- Pituitary gland
- Thyroid gland
- Adrenal gland
- Pancreas
- Parathyroid hormone
- Mechanism of hormone action

2. Nervous System

- Reflexes
- Cerebrospinal fluid (CSF)

- Autonomic nervous system (ANS)

3. Special Senses

- Vision
- Hearing
- Taste
- Smell

4. Temperature Regulation

- Hypothalamus
- Thermoregulation
- Fever

UNIT V **Hours: 6**

Digestive, Renal and Reproductive Physiology

1. Digestive System

- Gastrointestinal secretions
- Digestion
- Absorption

2. Renal System

- Structure of nephron
- Urine formation
- Renal function tests (RFTs)

3. Reproductive System

- Male and female reproductive physiology
- Reproductive hormones
- Menstrual cycle
- Pregnancy physiology

Practicals (Hours 20)

- Hemocytometer,
- hemoglobinometry,
- blood grouping, RBC/WBC count
- BP recording,
- heart sounds
- ECG tracing & interpretation
- Vital capacity
- stethography, reflex testing
- Effect of exercise on BP/pulse artificial respiration

Learning Outcomes

• Explain physiological functions of blood, cardiovascular, and respiratory systems.

• Measure basic physiological parameters (BP, ECG, pulmonary volumes). • Interpret normal and abnormal findings in physiological assessments.

• Apply knowledge to respiratory care procedures.

RTY103-BIOCHEMISTRY FOR HEALTH SCIENCES

L	T	P	C
2	1	1	4

Course Objectives

Students will be able to:

- Understand biochemical principles underlying body function and metabolism.
- Relate biochemical changes to diseases affecting respiratory and metabolic systems.
- Interpret results of clinical biochemistry investigations.

UNIT I (Hours: 13)

BASIC BIOCHEMISTRY & CELL BIOLOGY

- **Introduction to Apparatus**
  - Chemical balance
  - Molecular weight and atomic weight
  - Molarity and normality
  - Preparation of standards
- **Atomic Structure**
  - Acids, bases and salts
  - pH and buffers
- **Cell Structure**
  - Cell organelles
  - Biomembrane
  - Transport mechanisms
- **Digestion & Absorption**
  - Digestion and absorption of nutrients
  - Iron absorption and transport
- **Enzymes**
  - Classification of enzymes
  - Enzyme kinetics
  - Enzyme inhibition
- **Amino Acids**
  - Structure

- Ionic properties
- Electrophoresis

UNIT II **(Hours: 10)**

CARBOHYDRATES & METABOLISM

- **Carbohydrates**
  - Structure
  - Classification
  - Examples
- **Carbohydrate Metabolism**
  - Glycolysis
  - Glycogen metabolism
  - Polysaccharides
- **Minerals**
  - Calcium, phosphorus, magnesium
  - Iron, zinc, iodine, selenium, fluoride
  - Functions, dietary sources, deficiency and toxicity

UNIT III **(9Hours)**

PROTEINS, NUCLEIC ACIDS & VITAMINS

- **Proteins**
  - Structure
  - Types
  - Examples
- **Nucleic Acids**
  - DNA
  - RNA
  - Functions
- **Vitamins**
  - Fat-soluble vitamins
  - Water-soluble vitamins
  - Sources

- Deficiency disorders
- Toxicity

UNIT IV **(Hours: 10)**

HORMONES & CLINICAL BIOCHEMISTRY

- **Hormones**
  - Mechanism of hormone action
  - Pituitary hormones
  - Thyroid hormones
  - Adrenal hormones
  - Pancreatic hormones
  - Parathyroid hormone
- **Renal Function Tests**
  - Clearance tests
  - Non-protein nitrogen substances
  - Urine analysis

UNIT V **(Hours: 8)**

APPLIED BIOCHEMISTRY

- **Biochemistry of Cancer**
  - Tumor markers
  - Oncogenes
- **Applied Clinical Biochemistry**
  - Interpretation of biochemical investigations
  - Clinical correlation in respiratory and metabolic disorders

PRACTICALS **(Hours: 20)**

1. Specimen Collection (Blood, Urine, CSF)
2. Principles of Biochemical Investigations
3. Liver Function Tests
4. Renal Function Tests
5. Hormonal Evaluation

6. Cardiac Profile – Myocardial Infarction Markers
7. Enzymes and Their Significance
8. Nutrition and Digestion
9. Acid–Base Status
10. Blood Gases and Electrolytes

Learning Outcomes

- Explain biochemical principles of metabolism and regulation.
- Identify the biochemical basis of disease and diagnostic parameters.
- Perform and interpret basic biochemical and electrolyte investigations.
- Relate acid-base and metabolic balance to respiratory care practice.

RTY104-COMMUNICATION SKILLS & HEALTH INFORMATICS

L	T	P	C
2	1	1	4

UNIT I

Computer Fundamentals and Internet Basics

- **Basic Usage of Computer**
- Introduction to computers
- Operating system basics
- File and folder handling
- Internet usage
- Email usage and communication

UNIT II

Microsoft Office Applications

- **Microsoft Excel**
- Basics of Excel
- Functions and formulas
- Charts and graphs
- Data handling
- **Microsoft PowerPoint and Word**
- Preparation of presentation slides
- Document creation
- Formatting techniques
- Tables and graphics

UNIT III

Presentation and Communication Skills

- **Presentation Skills**
- Basics of presentation using technology
- Effective presentation delivery

- Verbal and non-verbal communication
- Audience interaction techniques

➢ **Spoken English**

- Conversational English
- Pronunciation
- Fluency development
- Everyday communication skills

UNIT IV

English Language Skills

➢ **English – Basics and Advanced**

- Grammar
- Vocabulary
- Sentence structure
- Functional English

➢ **Written English**

- Report writing
- Essay writing
- Letter writing
- Professional communication writing

UNIT V

Listening and Comprehension Skills

➢ **Listening Skills**

- Listening comprehension
- Audio exercises
- Note-taking skills
- Understanding spoken communication

Applied Communication Skills

- Communication in healthcare settings
- Patient interaction
- Team communication
- Professional etiquette

RTY 105-MEDICAL TERMINOLOGY & DOCUMENTATION

L	T	P	C
2	1	1	4

UNIT I

(Hours: 4)

Basics of Medical Terminology

Topics

- Introduction to medical terminology
- Importance in healthcare communication
- Derivation and origin of medical terms
- Latin and Greek roots
- Word roots, prefixes, and suffixes
- Meaning and application of medical terms
- Rules for combining morphemes
- Formation of plurals
- Pronunciation conventions

UNIT II

(Hours: 8)

Formation and Interpretation of Medical Terms

- Construction of medical terms
- Roots, prefixes, suffixes, and combining vowels
- Identification of commonly used medical terms
- Interpretation of abbreviations
- Acronyms and symbols in healthcare documentation
- Reading medical orders
- Interpretation of case sheets and reports
- Basic clinical terminology usage

UNIT III (Hours: 12)

System-based Medical Terminology

Circulatory System Terminology

- Heart and blood vessel terminology
- Common cardiovascular terms

Nervous System Terminology

- Brain, spinal cord, and nerve-related terms

Digestive System Terminology

- Gastrointestinal tract terminology

Respiratory System Terminology

- Respiratory organs and disease-related terms

Urinary System Terminology

- Kidney and urinary tract terminology

Reproductive System Terminology

- Male and female reproductive terms

Endocrine System Terminology

- Hormones and endocrine gland terminology

Musculoskeletal System Terminology

- Bone, joint, and muscle terminology

UNIT IV (Hours: 4)

Disease-specific and General Medical Terms

- Terminology related to diseases and disorders
- Pathological condition terminology
- Descriptive terms for signs and symptoms
- Diagnostic procedure terminology
- Common documentation phrases
- Patient assessment terminology
- Progress note terminology

UNIT V (Hours: 2)

Medical Documentation Essentials (Practical Component)

- Writing sample patient records
- Interpretation of laboratory reports
- Case summary preparation
- Decoding physician orders
- Medical chart entries
- Introduction to Electronic Health Records (EHR)
- EHR terminology and formats

LEARNING OUTCOMES

Students will be able to:

1. Construct and interpret medical terms accurately.
2. Decode abbreviations and symbols used in medical documentation.
3. Use medical terminology correctly in professional communication.
4. Interpret medical orders and reports from different specialties.
5. Demonstrate familiarity with documentation standards and electronic health records.

SUGGESTED TEACHING METHODS

- Lectures and interactive discussions
- Flashcards and word-building exercises
- Case-based learning
- Practical documentation workshops
- Audio-visual aids and online EHR demonstrations

RECOMMENDED TEXTBOOKS

1. The Language of Medicine – D. A. Chabner (2022), Elsevier.
2. Medical Terminology for Health Professions – A. Ehrlich & C. Schroeder (2021), Cengage Learning.
3. Medical Terminology: A Programmed Systems Approach – J. A. Rice (2020), Pearson.

RTVAC001: Professional Values, Ethics(VAC)

L	T	P	C
1	0	0	1

VALUE ADDED COURSE

COURSE OBJECTIVES

1. Outline professional values, attitude, and behavior.
2. Understand the importance of professional ethics and code of conduct.
3. Identify accountability and responsibility in healthcare practice.
4. Recognize the importance of teamwork and cultural sensitivity.

UNIT I:

Introduction to Professionalism **(3 hours)**

- Introduction to professionalism
- Professional values
- Integrity and objectivity
- Professional competence and due care

UNIT II:

Ethics and Confidentiality **(3 hours)**

- Confidentiality in healthcare
- Ethical and moral values
- Ethical dilemmas in healthcare
- Code of conduct

UNIT III:

Professional Accountability & Responsibility **(3hours)**

- Team efforts in healthcare
- Interdisciplinary healthcare teams
- Importance of collaboration
- Differences between professions

UNIT V:

Cultural Issues in Healthcare **(3 hours)**

- Cultural diversity in healthcare
- Cultural sensitivity
- Respect for patient beliefs and values
- Communication in multicultural environments

REFERENCE BOOKS

- Essentials of Professionalism, Professional Values & Ethics by Varinder Kaur
- Ethics in Science: Ethical Misconduct in Scientific Research, Second Edition by John D'Angelo
- A textbook on professional ethics and human values by R S Naagrazan

I st II nd Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	CL	C	MARKS		
								INT	EXT	TOTAL
1	RTY201	Community Health & Preventive Medicine	2	2	0	0	4	30	70	100
2	RTY202	Medical Microbiology	2	1	0	1	4	30	70	100
3	RTY203	Behavioral Sciences & Clinical Psychology	2	1	0	1	4	30	70	100
4	RTY204	Patient Assessment & Contact Techniques (T&P)	2	2	1	3	8	30	70	100
5	RTVAC002	Health and wealth being	1	0	0	0	1	-	-	-
Total			9	6	1	5	21	120	280	400

I[st] year II[nd] semester

L	T	P	C
2	2	0	4

RTY 2O1

COMMUNITY HEALTH & PREVENTIVE MEDICINE

UNIT I **(Hours: 6)**

Concepts of Health and Disease

- Introduction and concept of health
- Concept of disease
- Socio-cultural factors in disease
- Nutrition concepts
- Therapeutic diet
- Health care of the community

UNIT II **(Hours: 8)**

Epidemiology and Communicable Diseases

- Fundamentals of epidemiology
- Scope of epidemiology
- Water-borne diseases
- Air-borne diseases
- Vector-borne diseases
- Contact-borne diseases
- Zoonotic diseases
- Prevention and control of communicable diseases

UNIT III **(Hours: 6)**

Public Health Administration and National Health Programmes

- Health care delivery system
- Public health administration
- Principles of public health administration
- National Health Programmes – I
- National Health Programmes – II
- Reproductive and Child Health (RCH)

UNIT IV (Hours: 6)

Occupational Health and Health Education

- Occupational health hazards – I
- Occupational health hazards – II
- Occupational health control measures
- Health Education – I
- Health Education – II
- Health Education – III
- Information, Education and Communication (IEC)

UNIT V (Hours: 4)

Biostatistics and Research Methodology

- Biostatistics
- Research Methodology – I
- Research Methodology – II
- Basic data interpretation
- Community-based research concepts

FIELD VISITS / COMMUNITY POSTINGS

1. Visit to Rural Health Training Centre (RHTC)

- Duration: 1 Day

2. Visit to Urban Health Training Centre (UHTC)

- Duration: 1 Day

LEARNING OUTCOMES

Students will be able to:

1. Explain concepts of health, disease, and prevention.
2. Identify common communicable diseases and their control measures.
3. Understand public health administration and national health programmes.
4. Apply principles of occupational health and health education.
5. Interpret basic epidemiological and biostatistical data.
6. Understand community healthcare delivery systems and field practices.

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RTY202	2	1	0	4

MEDICAL MICROBIOLOGY FOR RESPIRATORY TECHNOLOGY

UNIT I **(Hours: 7)**

Basics of Microbiology and Bacteriology

- **History of Microbiology**
- Discovery of microorganisms
- Pioneers in microbiology
- Germ theory of disease
- Contributions to respiratory medicine
- **Morphology and Physiology of Bacteria**
- Classification of bacteria
- Bacterial structure
- Growth and reproduction
- Bacterial spores and significance

3. Sterilization and Disinfection

Principles and methods of sterilization

- Disinfection methods
- Biosafety levels
- Infection control in respiratory equipment

5. Normal Flora of Human Body

- Respiratory tract flora
- Skin and mucosal flora
- Role in health and disease

5. Infection – Sources and Spread ***(2 Hours)***

- Chain of infection
- Modes of transmission
- Reservoirs of infection
- Infection prevention and control measures

UNIT II (Hours: 8)

Hospital Infection and Immunology

- **Hospital-acquired Infections (HAI)**
- Types of HAIs
- Risk factors
- Prevention
- Ventilator-associated pneumonia (VAP)
- Catheter-associated infections
- **Immunity**
- Innate immunity
- Adaptive immunity
- Immune mechanisms in respiratory infections
- **Antigen–Antibody Reactions**
- Serological tests
- Clinical applications
- **Immune Response**
- Primary and secondary immune response
- Cellular and humoral immunity
- **Hypersensitivity and Allergy**
- Types of hypersensitivity reactions
- Allergic asthma
- Immune-mediated airway diseases
- **Immunoprophylaxis**
- Vaccines and immunization
- BCG, influenza, COVID-19, pneumococcal vaccines

7. **Antibiotics**
    - Mechanism of action
- Antibiotic resistance
- Antibiotic stewardship

UNIT III (Hours: 5)

Tuberculosis, Virology and HIV

1. Mycobacterium tuberculosis

- Pathogenesis
- Diagnosis
- Prevention
- MDR-TB and DOTS strategy

2. General Properties of Viruses

- Structure of viruses
- Classification
- Replication

3. Virus–Host Interactions

- Pathogenesis of viral infections
- Host response
- Viral latency

- **HIV/AIDS and STIs**

Pathogenesis

- Laboratory diagnosis
- Respiratory complications
- Infection control precautions

- **Medical Mycology *(1 Hour)***

- Aspergillosis
- Candidiasis
- Respiratory fungal infections

UNIT IV (Hours: 3)

Medical Parasitology and Upper Respiratory Infections

1. Medical Parasitology

- Medically important parasites
- Respiratory manifestations

2. Upper Respiratory Tract Infections

- Pharyngitis
- Tonsillitis
- Sinusitis
- Otitis media
- Etiology, pathogenesis, and prevention

UNIT V (Hours: 7)

Lower Respiratory Tract Infections

1. Lower Respiratory Tract Infections

- Bacterial pneumonia
- Viral pneumonia
- Fungal pneumonia
- Hospital-acquired pneumonia
- RSV infection
- Influenza
- COVID-19
- Laboratory diagnosis and prevention

2. Applied Respiratory Microbiology

- Respiratory specimen collection
- Sputum examination
- Infection control practices
- ICU infection prevention
- Respiratory care equipment handling
- Role of respiratory therapists in infection control

PRACTICAL / DEMONSTRATION (15 Hours)

1. Gram Stain

- Demonstration of Gram staining technique
- Identification of Gram-positive bacteria
- Identification of Gram-negative bacteria

2. Acid-Fast Stain

- Demonstration of Ziehl–Neelsen staining
- Identification of *Mycobacterium tuberculosis*

3.Antibiotic Susceptibility Testing

- Kirby–Bauer disc diffusion method
- Interpretation of antibiotic sensitivity patterns

4.Visit to CSSD / Microbiology Laboratory

- Observation of sterilization techniques
- Media preparation methods
- Biosafety protocols

5. Bedside Infection Control Training

- Infection control practices in ICU
- Infection prevention during mechanical ventilation
- Infection control in aerosol therapy settings
- Hand hygiene techniques
- Use of personal protective equipment (PPE)
- Biomedical waste disposal practices

LEARNING OUTCOMES

After successful completion of this course, the student will be able to:

1. Identify and describe major microorganisms responsible for respiratory and systemic infections.
2. Apply principles of sterilization, disinfection, and infection prevention in clinical practice.
3. Understand the immune response and its role in respiratory infections.
4. Demonstrate basic microbiological procedures.
5. Recognize and participate in hospital infection control and antibiotic stewardship programs.

TEACHING AND LEARNING METHODS

1. Interactive lectures with visuals and case discussions
2. Microbiology laboratory demonstrations

3. Clinical visits (CSSD, ICU, Infection Control Unit)
4. Problem-based learning using respiratory infection case scenarios
5. Video demonstrations on sterilization and biosafety

RECOMMENDED TEXTBOOKS

1. Textbook of Microbiology – Ananthanarayan, R., & Paniker, C. K. J. (2023). Universities Press.
2. Jawetz, Melnick, and Adelberg's Medical Microbiology – Brooks, G. F., Carroll, K. C., Butel, J. S., & Morse, S. A. (2022). McGraw Hill.
3. Essentials of Medical Microbiology – Apurba S. Sastry & Sandhya Bhat (2022). Jaypee Brothers.
4. Centers for Disease Control and Prevention – CDC Guidelines for Infection Prevention and Control in Healthcare Settings (latest update).

RTY 203-BEHAVIORAL SCIENCES & CLINICAL PSYCHOLOGY

L	T	P	C
2	1	0	4

UNIT I (Hours: 5)

Introduction to Psychology and Behaviour

- **Introduction to Psychology**
- Definition and scope of psychology
- Branches of psychology
- Relevance to healthcare and Respiratory Technology
- Behavioural medicine concepts
- **Biological Basis of Behavior**
- Structure and function of nervous system
- Brain–behavior relationship
- Effects of hypoxia, sleep, and respiratory distress on behaviour and cognition
- **Learning**
- Classical conditioning
- Operant conditioning
- Reinforcement
- Behaviour modification
- Smoking cessation strategies
- Pulmonary rehabilitation adherence

UNIT II (Hours: 5)

Cognitive Processes and Intelligence

- **Cognitive Learning**
- Observational learning
- Motivation
- Patient education strategies

- Self-care promotion
- Treatment adherence in chronic lung disease

➢ **Memory**

- Types of memory
- Forgetting and recall
- Importance in patient education and rehabilitation

3. Thinking

- Problem-solving
- Clinical reasoning
- Decision-making
- Cognitive biases in healthcare practice

4. Intelligence

- Types of intelligence
- Measurement of intelligence
- Emotional intelligence
- Role in teamwork and therapeutic interaction

UNIT III (Hours: 5)

Personality and Mental Health

1. Personality

- Major theories of personality
- Personality traits and coping behaviour
- Compliance and health behaviour

2. Mental Health

- Concepts of mental health and illness
- Psychological aspects of chronic respiratory diseases
- Anxiety and depression in COPD
- Psychological effects of sleep disorders

3. Stress

- Types and sources of stress
- Stress response
- Burnout among healthcare professionals
- Stress management techniques

UNIT IV **(Hours: 5)**

Counselling and Communication Skills

1. Counselling

- Principles of counselling
- Counselling techniques
- Patient-centred communication
- Lifestyle modification counselling
- Anxiety management
- End-of-life care counselling

2. Communication

- Therapeutic communication
- Empathy and listening skills
- Rapport building
- Handling difficult patients and families
- Communication in respiratory care settings

UNIT V **(Hours: 7)**

Practicals

Activities

- Role play sessions on patient counselling
- Communication skill practice
- Stress management exercises
- Case-based discussions (COPD anxiety, ventilator dependence)
- Group discussions and reflective activities
- Audio-visual demonstrations
- Therapeutic interaction exercises

LEARNING OUTCOMES

After successful completion of the course, students will be able to:

1. Describe psychological concepts relevant to patient behaviour and motivation.
2. Apply psychological principles to improve patient communication and compliance.
3. Recognize emotional and behavioural problems in respiratory patients.
4. Demonstrate counselling and stress management techniques.
5. Provide holistic patient care using behavioural and psychological understanding.

TEACHING AND LEARNING METHODS

- Interactive lectures and discussions
- Case-based learning
- Role plays and counselling practice
- Audio-visual presentations
- Reflective journaling
- Group activities

RECOMMENDED TEXTBOOKS

1. Abnormal Psychology and Modern Life – Carson, Butcher & Mineka (2022), Pearson.
2. Psychology: The Science of Mind and Behavior – Pearson (2020).
3. Health Psychology – McGraw Hill (2023).
4. Positive Psychology in Clinical Practice – APA Press (2021).

L	T	P	C
2	2	1	8

204-PATIENT CONTACT TECHNIQUES

UNIT I

(Hours: 10)

Patient Interaction and Clinical Assessment

1. Preparation for Patient Meeting

- Individualized patient care
- Empathetic communication
- Privacy and cultural sensitivity
- Patient education and shared decision-making
- Family participation
- Interprofessional communication and coordination

2. Medical History and Interview

- Principles of patient interview
- Structuring history of present illness (HPI)
- Alternative history sources
- Cardiopulmonary and comprehensive history
- Review of medical records and orders
- Pulmonary assessment standards

3. Cardiopulmonary Symptoms

- Cough and sputum
- Hemoptysis
- Dyspnea
- Chest pain
- Syncope and edema
- Fever and chills
- Headache and altered mental status
- Snoring and GERD

4. Vital Signs

- Frequency and trending
- Height and weight assessment
- Pain scales
- Sensorium assessment
- Temperature, pulse, respiration, blood pressure

5. Older Patient Assessment

- Communication strategies
- Sensory deficits
- Organ aging
- Atypical presentations
- Functional assessment

UNIT II (Hours: 8)

Physical Examination and Laboratory Assessment

1. **Fundamentals of Physical Examination**

- Head, neck, and eyes
- Lung topography and surface markings
- Thorax examination
- Inspection, palpation, percussion, auscultation
- Precordium and abdomen assessment
- Extremity signs

2. Neurologic Assessment

- Functional neuroanatomy
- GCS and MMSE
- Cranial nerves
- Reflexes and coordination
- Breathing and cardiovascular control
- Brain death and apnea testing

3. Clinical Laboratory Studies ***(2 Hours)***

- Phases of testing
- Hematology investigations
- Chemistry investigations
- Microbiology specimens
- Cytology and histology

4. Documentation ***(2 Hours)***

- Medicolegal aspects
- Organizing patient data
- SOAP, APIE, PIP, SBAR formats
- Electronic documentation

UNIT III

Infection Control and Airway Clearance **(Hours: 8)**

1. Principles of Infection Control

- Standard precautions
- Transmission-based precautions
- Hand hygiene
- Personal protective equipment (PPE)
- Disinfection practices

2. **Bronchial Hygiene Therapy (BHT)**

- Physiology of airway clearance
- Goals and indications
- COPD and secretion management

3. Lung Expansion Therapy (LET)

- Atelectasis
- Clinical signs
- Chest physiotherapy adjuncts

3. **Chest Physical Therapy (CPT)**

- Indications

- Percussion and vibration techniques
- Monitoring during therapy

UNIT IV **(Hours: 7)**

Breathing Exercises and Airway Management

1. **Breathing Exercises**
   - Diaphragmatic breathing
   - Pursed-lip breathing
   - Program design

2. Postural Drainage Therapy

- Principles and positions
- Indications and contraindications

3. Airway Clearance Techniques

- Oral suctioning
- Nasopharyngeal suctioning
- Endotracheal suctioning
- Catheter handling

4. Applied Anatomy and Physiology of Lungs

- Clinical correlation of lung anatomy
- Bedside respiratory assessment

5. Basic Life Support – Adult

- Adult CPR theory
- BLS algorithms
- Emergency response basics

UNIT V **(Hours: 9)**

Basic Life Support and Emergency Care

1. Basic Life Support – Pediatric

- Pediatric CPR theory
- Pediatric BLS algorithms

2. **Foreign Body Airway Obstruction**
   - Recognition

- Heimlich maneuver
- Back blows

3. Infant Basic Life Support

- Infant CPR
- Choking management

4. Adult BLS Refresher and Integration

- Practical integration
- Advanced emergency response concepts

5. Pediatric BLS Refresher and Integration

- Pediatric emergency management
- Simulation-based integration

6. Emergency Communication and Team Coordination

- Emergency handover
- Team coordination during resuscitation

PRACTICAL / SKILLS SESSIONS **(Hours: 84)**

1. Medical History Taking

- Patient interview techniques
- Structured history taking
- Reviewing medical records
- Role-play sessions

2. Cardiopulmonary Symptom Assessment

- Bedside symptom evaluation
- Case-based assessment

3. Basic Patient Assessment and Vital Signs

- Blood pressure measurement
- Pulse assessment
- Respiratory rate assessment
- Temperature recording
- Pain scale assessment

- Sensorium evaluation

4. Clinical Examination

- Inspection techniques
- Palpation techniques
- Percussion techniques
- Auscultation of lungs and heart

5. Neurologic Assessment

- Glasgow Coma Scale (GCS)
- Cranial nerve examination
- Reflex testing
- Coordination assessment

6.Clinical Laboratory Specimen Handling

- Sputum specimen handling
- Blood sample handling
- BAL specimen basics
- Pleural fluid handling

7. Documentation and Goal Setting

- SOAP notes
- SBAR handover
- Case chart preparation

8. Bedside Patient Assessment

- Bedside rounds
- Case presentation practice

9. Infection Control Practices

- Hand hygiene
- PPE practice
- Isolation precautions
- Disinfection drills

10. Bronchial Hygiene Therapy (BHT)

- Device demonstrations
- Assisted coughing
- Secretion monitoring

11. Lung Expansion Therapy (LET)

- Incentive spirometry
- IPPB demonstration
- Monitoring techniques

12. Chest Physical Therapy (CPT)

- Percussion practice
- Vibration practice
- Positioning techniques

13. Breathing Exercises

- Diaphragmatic breathing practice
- Pursed-lip breathing practice
- Program design

14. Postural Drainage Therapy

- Positioning practice
- Contraindications assessment

15. Airway Clearance Techniques

- Oral suctioning practice
- Nasopharyngeal suctioning
- Endotracheal suctioning

16. Adult BLS Practice

- CPR manikin practice
- Chest compressions
- Ventilation techniques
- AED usage

17. Pediatric BLS Practice

- Pediatric CPR manikin practice

- Age-appropriate techniques

18. Foreign Body Airway Obstruction Management

- Heimlich maneuver practice
- Simulation drills

19. Infant BLS Practice

- Infant CPR
- Infant choking management

20. Bedside Rounds and Case Presentation

- Summative practical assessment
- Case presentation skills

Learning Outcomes

After completion, the student will be able to:

• Conduct safe, respectful, and effective patient encounters and history-taking.

• Recognize and prioritize cardiopulmonary symptoms warranting urgent action.

• Perform systematic physical exams of chest and cardiovascular system and document findings.

• Implement infection control, airway clearance, and BLS procedures competently.

• Communicate and handover patient care using structured formats (SBAR, SOAP).

RTVAC-002 Health and Well-Being(VAC)	L	T	P	C
	1	0	0	1

VALUE ADDED COURSE

COURSE OBJECTIVES

1. Understand the concepts of physical, mental, and social health.
2. Promote healthy lifestyle practices and preventive healthcare.
3. Develop stress management and coping strategies.
4. Create awareness regarding overall health and well-being.

UNIT I

Introduction to Health and Physical Fitness **(3 Hours)**

- Concepts of health and well-being
- Dimensions of health: Physical, mental, social, and emotional
- Impact of lifestyle choices on health
- Importance of physical activity and exercise
- Types of exercise and personal fitness planning

UNIT II:

Nutrition and Healthy Lifestyle **(3 Hours)**

- Understanding mental health and emotional well-being
- Emotional resilience and coping strategies
- Stress and its effects on health
- Relaxation and mindfulness techniques
- Time management for stress reduction

UNIT III:

Sleep, Social Health, and Addiction Awareness **(3 Hours)**

- Importance of sleep and recovery
- Sleep hygiene and healthy sleep habits
- Social relationships and communication

- Community involvement and well-being
- Substance use, addiction, and preventive measures

UNIT IV:

Chronic Diseases and Healthy Habit Formation **(3 Hours)**

· Common chronic diseases and risk factors

· Lifestyle modifications for disease prevention

· Health screening and monitoring

· Psychology of habit formation

· Strategies for maintaining healthy behaviors

IInd year IIIrd semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	CL	C	MARKS		
								INT	EXT	TOTAL
1	RTY301	Applied Pathology	2	1	1	0	4	30	70	100
2	RTY302	Pharmacology for Respiratory Care	2	1	1	0	4	30	70	100
3	RTY303	Pulmonary Diseases – I	2	1	1	0	4	30	70	100
4	RTY304	Fundamentals of Respiratory Care (T&P)	3	1	1	3	8	30	70	100
5	RTVAC003	Stress Management	1	0	0	0	1	-	-	-
Total			10	4	4	3	21	120	280	400

L	T	P	C
2	1	1	4

II[nd] year III[rd] semester

RTY-301 APPLIED PATHOLOGY

UNIT I (Hours: 5)

Cell Injury, Inflammation and Tissue Repair

1. Introduction to Pathology and Terminology

- Cell injury
- Reversible and irreversible injury
- Cellular adaptations
- Intracellular accumulations
- Pathological calcification

2. Inflammation and Tissue Repair

- Acute inflammation
- Signs of inflammation
- Vascular events
- Cellular events
- Purpose and classification of inflammation
- Steps of tissue repair

UNIT II (Hours: 7)

Hemostasis, Nutrition and Infectious Diseases

1. Hemostasis, Coagulation and Thrombosis *(4 Hours)*

- Edema
- Congestion
- Hemorrhage
- Embolism
- Infarction
- Shock

2. Nutrition and Infectious Diseases

- Protein energy malnutrition (PEM)
- Vitamin deficiency disorders
- Bacterial infections
    - Tuberculosis
    - Leprosy
    - Typhoid
- Viral infections
    - Dengue
- Fungal infections
- Protozoal infections
    - Malaria
    - Amoebiasis

UNIT III **(Hours: 7)**

Neoplasia and Cardiovascular Pathology

1. **Neoplasia and Tumor Pathology**

- Classification of tumors
- Growth rate
- Local invasion
- Metastasis pathways
- Carcinogens
- Oncogenic viruses
- Benign vs malignant tumors
- Paraneoplastic syndromes
- Tumor markers

2. Cardiovascular Pathology

- Ischemic heart disease (IHD)
- Pathogenesis and complications
- Hypertension pathology
- Aneurysm types

- Rheumatic heart disease
- Infective endocarditis
- Congenital heart diseases overview

UNIT IV **(Hours: 3)**

Respiratory Pathology

1. Respiratory Pathology

- Pneumonia
- Pathogenesis and complications
- Tuberculosis
- COPD pathogenesis and complications
- Lung tumors and classification

UNIT V **(Hours: 8)**

Gastrointestinal and Genitourinary Pathology

1. Gastrointestinal Pathology

- Peptic ulcer disease
- Gastric carcinoma morphology
- Colorectal carcinoma morphology
- Viral hepatitis
- Alcoholic liver disease
- Cirrhosis

2. Genitourinary Pathology

- Glomerular diseases
- Tubular diseases
- Vascular diseases of kidney
- Renal stones
- Urinary tract tumors

DEMONSTRATION / PRACTICAL (Hours: 6)

Topics

- Demonstration of histology slides
- Identification of pathological changes in tissues
- Laboratory visit
- Observation of pathology laboratory procedures
- Interpretation of basic pathology reports

LEARNING OUTCOMES

After successful completion of this course, the student will be able to:

1. Explain mechanisms of cell injury, inflammation, tissue repair, and hemostasis.
2. Identify pathological features of major organ systems.
3. Recognize respiratory pathologies such as TB, pneumonia, COPD, and lung tumors.
4. Relate pathology findings to clinical diagnosis and management.
5. Interpret basic pathology slides and laboratory reports.

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2	1	3	4

RTY302- PHARMACOLOGY FOR RESPIRATORY TECHNOLOGY

COURSE OBJECTIVES

Students will be able to:

1. Understand basic pharmacological principles, drug actions, ADME, and adverse drug reactions.
2. Describe pharmacology of major drug classes used in respiratory, cardiovascular, CNS, renal, and infectious disease management.
3. Interpret prescriptions, calculate doses, and understand drug interactions and side effects relevant to respiratory care.

UNIT I (Hours: 4)

General Pharmacology

1. General Pharmacology

- Definitions and sources of drugs
- Routes of drug administration
- Drug delivery systems and formulations
- Drug absorption and bioavailability
- Biotransformation and excretion
- Drug targets and mechanisms
- Factors influencing drug action
- Adverse drug reactions (ADR types)

UNIT II (Hours: 6)

Autonomic and Renal Pharmacology

1. Autonomic Nervous System Pharmacology

- Parasympathetic and sympathetic nervous system
- Cholinergic drugs

- Anti-cholinesterases
- Anticholinergic drugs
- Adrenergic drugs
- Alpha and beta blockers
- Clinical applications

2. Drugs Acting on the Kidney

- Diuretics and sites of action
- Clinical uses of diuretics
- Adverse effects
- ADH and ADH antagonists

UNIT III (Hours: 6)

Cardiovascular and CNS Drugs

1. Cardiovascular Drugs

- Antihypertensive drugs
- Antiarrhythmic drugs
- Drugs used in heart failure
- Antianginal agents

2. Central Nervous System Drugs

- General anesthetics
- Local anesthetics
- Sedatives and hypnotics
- Alcohols
- Antiepileptic drugs
- Opioids
- Mechanism of action
- Uses and toxicity

UNIT IV (Hours: 8)

Respiratory Drugs, Autacoids and Hormones

1. Autacoids and Respiratory Drugs

- Antihistamines
- NSAIDs
- Cough remedies
- Bronchodilators
- Anti-asthma drugs
- Mechanism of action
- Adverse drug reactions
- Gastrointestinal drugs
    - Antiemetics
    - Antiulcer drugs

2. Blood and Hormones

- Hematinics
- Anticoagulants
- Antiplatelet drugs
- Fibrinolytics
- Hypolipidemic drugs
- Insulin
- Oral hypoglycemic agents
- Antithyroid drugs

UNIT V (Hours: 6)

Chemotherapy and Antimicrobial Drugs

1. Chemotherapy

- Antimicrobials and classification
- Antibiotic resistance
- Penicillins

- Cephalosporins
- Macrolides
- Aminoglycosides
- Fluoroquinolones
- Anti-tubercular drugs
- Antiviral drugs
- Antifungal drugs
- Antimalarial drugs
- Antihelminthic drugs
- Basics of cancer chemotherapy

DEMONSTRATION / PRACTICAL

1. Prescription Writing and Interpretation

- Prescription reading
- Respiratory care drug prescriptions
- Drug abbreviations and dosage forms

2. Experimental Pharmacology Demonstration

- Demonstration of drug effects on models
- Observation of pharmacological responses

3. Dose Calculation Exercises

- Drug dosage calculations
- Infusion calculations
- Chart interpretation

4. Drug Administration Techniques

- Oral drug administration
- Intravenous administration
- Nebulization techniques
- Inhaler techniques

LEARNING OUTCOMES

After successful completion of this course, the student will be able to:

1. Describe principles of pharmacodynamics and pharmacokinetics.
2. Explain pharmacotherapy used in respiratory diseases.
3. Discuss bronchodilators, corticosteroids, antibiotics, and anti-TB regimens.
4. Interpret prescriptions safely and accurately.
5. Calculate drug dosages and identify adverse drug reactions relevant to respiratory care.

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2	1	0	4

RTY303- PULMONARY DISEASES – I

COURSE OBJECTIVES

Students will be able to:

1. Understand pathology, clinical presentation, diagnosis, and management principles of common respiratory diseases.
2. Correlate imaging, laboratory, and histopathology findings with clinical cases.
3. Participate in case-based reviews and bedside management discussions of respiratory pathologies.

UNIT I (Hours: 2)

Airway Diseases

- Bronchitis
- Bronchiectasis

UNIT II (Hours: 4)

- Pulmonary Infections and Embolism
- Lung Cancer and Lung Abscess
- Community-Acquired Pneumonia
- Hospital-Acquired Pneumonia

UNIT III (Hours: 3)

Obstructive and Pleural Diseases

- COPD
- Pneumothorax
- Pleural Diseases and Pleural Effusion

UNIT IV (Hours: 2)

Pulmonary Emergencies

1. Pulmonary Edema and Management

2. ARDS / SARS

UNIT V

Toxic Injury and Respiratory Failure

- Toxic Inhalation and Smoke Injury
- Acute Respiratory Failure

PRACTICAL / CLINICAL DEMONSTRATIONS

1. Case Discussions: Bronchitis and Bronchiectasis

- Bedside case discussion
- Symptom assessment
- Clinical correlation

2. Case-Based Discussion: Pulmonary Embolism

- Risk factor analysis
- Imaging interpretation
- Emergency management discussion

3. Lung Cancer Work-up

- Radiology review
- Cytology interpretation
- Histopathology discussion

4. Case Review: Lung Abscess

- Clinical features
- Imaging findings
- Treatment planning

5. Community-Acquired Pneumonia

- Bedside case assessment
- Chest X-ray findings
- Antibiotic management discussion

6. Hospital-Acquired Pneumonia

- ICU case discussion
- Sputum culture interpretation
- Infection control measures

7. COPD Bedside Assessment and Spirometry Demonstration

- Clinical examination
- Spirometry demonstration
- Severity assessment
- Oxygen therapy discussion

8. Pneumothorax Management

- Chest X-ray interpretation
- Needle decompression demonstration
- Chest tube management

9. Pleural Effusion Assessment

- Thoracentesis demonstration
- Pleural fluid analysis
- Ultrasound-guided procedure demonstration

10. Pulmonary Edema

- Case analysis
- Echocardiography correlation
- Diuretic therapy discussion

11. ARDS / SARS

- Case presentation
- Ventilator management demonstration
- ICU monitoring discussion

12. Toxic Inhalation / Smoke Injury

- Emergency response simulation
- Airway management principles

13. Acute Respiratory Failure

- Bedside case assessment
- ABG interpretation
- ABG-driven treatment planning
- Oxygen and ventilatory support discussion

LEARNING OUTCOMES

After successful completion of this course, the student will be able to:

1. Diagnose and differentiate common respiratory diseases using history, clinical examination, imaging, and laboratory findings.
2. Demonstrate bedside skills for pleural procedures, chest tube management, and emergency respiratory interventions.
3. Interpret ABGs, spirometry, and chest radiology findings relevant to respiratory pathology.
4. Assist in emergency respiratory care and ventilator management.
5. Correlate clinical, laboratory, and radiological findings for respiratory disease management.

RTY304-Fundamentals of Respiratory Care (Theory & Practical)	L	T	P	C
	3	1	1	8

Course Description

Introductory course covering the core, day-to-day clinical skills and knowledge required of a respiratory therapist: patient assessment, oxygen and aerosol therapy, airway care and suctioning, humidification, basic ventilatory support including NIV, monitoring and bedside investigations, infection control, emergency response and documentation. Strong emphasis on hands-on skills, simulation and bedside clinical exposure.

Course Objectives

By the end of the course the student will be able to:

- Perform structured cardiopulmonary assessment and interpret basic investigations.
- Deliver safe oxygen therapy, humidification and aerosol therapy using common devices.
- Perform airway care including suctioning and tracheostomy maintenance.
- Initiate and manage basic non-invasive ventilatory support and understand indications for invasive ventilation.
- Monitor respiratory patients (SpO_2, capnography basics, ABG interpretation) and respond to common emergencies (BLS).
- Apply infection control, equipment care and accurate documentation in respiratory practice.

UNIT I

BASIC EQUIPMENT & OXYGEN THERAPY **(18 Hours)**

1. Cylinders, Pressure Regulators, Flow Meters, Bourdon Gauge Manometers
2. Oxygen Therapy — Oxygen sources, flowmeters, concentrators, cylinders, low-flow vs high-flow systems, nasal cannulae, simple mask, non-rebreather mask, HFNO principles, humidified oxygen, safety

UNIT II **(14 Hours)**

AIRWAY MANAGEMENT & AIRWAY CLEARANCE

1. Airway Management & Artificial Airways — Oropharyngeal and nasopharyngeal airways, endotracheal tube basics, tracheostomy tube types and care, cuff care, tube fixation, extubation basics

2. Suctioning & Airway Clearance — Indications, equipment, open vs closed suction, catheter selection, infection prevention, assisted cough, huff/cough techniques

UNIT III **(12 Hours)**

AEROSOL THERAPY & VENTILATORY SUPPORT

- Aerosol Therapy & Humidification — pMDI, spacer technique, DPI, jet and ultrasonic nebulizers, aerosol particle concepts, heated humidifiers, HME, humidification for ventilated patients
- Non-invasive Ventilation (NIV) & CPAP — Indications, interfaces, ventilator types, setup and monitoring, troubleshooting, patient selection, complications

UNIT IV **(22 Hours)**

MONITORING & BEDSIDE INVESTIGATIONS

- Manual Resuscitators, Oxygen Monitors, Flow Sensors
- Monitoring & Bedside Investigations — Pulse oximetry, capnography basics, ABG sampling and interpretation, chest X-ray basics for respiratory therapy, basic PFT/spirometry demonstration
- Capnography, Pulse Oximeters, Transcutaneous Monitoring

UNIT V **(24 Hours)**

CHEST PHYSIOTHERAPY, INFECTION CONTROL & PROFESSIONAL PRACTICE

- Chest Physiotherapy & Lung Expansion — Postural drainage, percussion, vibration, incentive spirometry, IPPB basics, lung recruitment principles
- Infection Control & Equipment Care — Standard and transmission-based precautions, PPE, disinfection and sterilization of circuits and devices, CSSD basics, biomedical waste management
- Documentation, Communication & Ethics — Charting (SOAP, SBAR), handover, medico-legal aspects, patient education, family communication, discharge planning

PRACTICALS & CLINICAL (15 Hours)

PRACTICAL SKILL SESSIONS

- Device Familiarization: Flowmeters, Oxygen Delivery Devices, HFNO, Humidifiers – 2 Hours
- Nebulizer / MDI / DPI Technique Practice and Spacer Demonstration
- Suctioning Practice on Manikin (Open & Closed Systems) and ET Tube Suction Simulation
- Tracheostomy Care and Humidification for Tracheostomy
- Spirometry and Basic Pulmonary Function Test (PFT) Demonstration
- ABG Sampling Practice (Arterial Puncture Simulation / Tutor-guided Practice) and Sample Handling
- Pulse Oximetry and Capnography Monitoring Laboratory
- Basic Life Support (BLS) Manikin Practice (Adult/Pediatric/Infant) and Choking Drill
- Basic NIV / CPAP Setup on Trainer

CLINICAL / BEDSIDE EXPOSURE (15 Hours)

1. Bedside Oxygen Therapy and Monitoring
2. Suctioning and Airway Clearance on Patients Under Supervision
3. Tracheostomy Dressing and Suctioning Bedside
4. Participation in Ward Rounds, Documentation, Charting and SBAR Handover Practice
5. ABG Sample Collection and Immediate Interpretation with Mentor
6. NIV / CPAP Application, Mask Fitting and Monitoring in Ward / HDU

BRTVAC-003 Stress Management (VAC)

L	T	P	C
1	0	0	1

COURSE OBJECTIVES

1. Understand the concept, causes, and types of stress.
2. Identify physical, emotional, and behavioral responses to stress.
3. Learn stress management and coping techniques.
4. Develop emotional resilience and mental well-being.
5. Promote balance between personal and professional life.

UNIT I:

Introduction to Stress and Stress Responses **(3 Hours)**

- Definition of stress: Eustress and distress
- Types of stress: Acute and chronic stress
- Biology of stress and fight-or-flight response
- Effects of stress on physical and mental health
- Role of perception and coping mechanisms

UNIT II:

Identifying Stressors and Stress Process

- Internal and external stressors
- Stress patterns: Thoughts, emotions, and behaviors
- Physical and emotional responses to stress
- Emotional regulation in stress management
- Stress development and escalation process

UNIT III:

Coping Strategies and Relaxation Techniques **(3 Hours)**

- Problem-focused and emotion-focused coping
- Cognitive Behavioral Therapy (CBT) techniques
- Relaxation methods and breathing exercises
- Time management and organizational skills
- Developing personal coping plans

UNIT IV:

Lifestyle and Workplace Stress Management **(3 Hours)**

- Role of exercise and physical activity
- Sleep hygiene and nutrition in stress control
- Social support and healthy relationships
- Managing academic and workplace stress
- Self-care and burnout prevention

UNIT V:

Building Long-Term Stress Resilience **(3 Hours)**

- Resilience theory and emotional intelligence
- Growth mindset and adapting to challenges
- Mindfulness and meditation practices
- Integrating stress management into daily life
- Maintaining long-term mental well-being

RECOMMENDED TEXT BOOK

- Stress Management: From Basic Science to Best Practice

IV Semester II Year

S.NO	SUBJECT CODE	SUBJECT	L	T	P	CL	C	MARKS		
								INT	EXT	TOTAL
1	RTY401	Pulmonary Diseases – II	2	1	1	0	4	30	70	100
2	RTY402	Diagnostic & Therapeutic Procedures in Respiratory Care (T&P)	1	1	1	0	3	30	70	100
3	RTY403	Principles of Mechanical Ventilation – I (T&P)	2	1	1	0	4	30	70	100
4	RTY404	Applied Cardiopulmonary Anatomy & Physiology	2	1	0	0	3	30	70	100
5	RTY405	Clinical Practicum I	0	0	1	5	6	30	70	100
6	RTVAC 004	Environmental Awareness	1	0	0	0	1	-	-	-
Total			8	4	4	5	21	150	350	500

L	T	P	C
2	1	1	4

FOURTH SEMESTER

RTY401-Pulmonary Diseases II

Course Objectives

Students will be able to:

1. Describe pathology and clinical features of a wide spectrum of respiratory and related systemic conditions.

2. Correlate pathophysiology with clinical presentation, investigations and basic management priorities.

3. Recognize occupational, toxic, neurologic and disaster-related respiratory problems

Topics **(15 Hours)**

- Viral and Fungal Lower Respiratory Tract Infections
- Upper Respiratory Tract Infections
- Occupational Lung Diseases
- Sleep Disorders
- Asthma
- Pulmonary Hypertension
- Flail Chest, Mediastinal and Chest Wall Diseases
- Dyspnea and its Management
- Myasthenia Gravis and Guillain–Barré Syndrome (Respiratory Implications)
- Snake Bite, Poisoning, Hanging and Tetanus (Respiratory Effects)
- Restrictive Lung Disorders
- Near Drowning
- Poisoning and Burn Injury (Respiratory Complications)

Practical:

Case discussion for each topic (2 hrs.) which will be a total of 30 hrs.

Learning Outcomes

• Explain pathogenesis and complications of listed respiratory diseases.

• Identify red flags and basic acute management principles for toxic, neurologic and airway-compromising conditions.

• Correlate disease processes with diagnostic approaches in respiratory pathology.

RTY 402-Diagnostic & Therapeutic Procedures in Respiratory Care

L	T	P	C
2	1	1	4

Course Objectives

Students will be able to:

- Understand principles, indications and interpretation of common cardiopulmonary diagnostic techniques.
- Perform/assist safely in bedside and laboratory diagnostics relevant to respiratory care.
- Interpret ECGs, ABGs, PFTs and basic imaging for integration into clinical decision-making.

UNIT I (5 Hours)

CARDIAC ELECTROPHYSIOLOGY & HEMODYNAMICS

- Electrical Conduction System of the Heart
- Normal ECG & Lead Placement (12-Lead Standardization)
- Cardiac Arrhythmias I
- Cardiac Arrhythmias II
- Factors Affecting Cardiac Output

UNIT II (4 Hours)

INVASIVE CARDIORESPIRATORY MONITORING

- Central Venous Catheterization
- Pulmonary Artery Catheterization
- Arterial Line Insertion & ABP Monitoring

UNIT III (7 Hours)

RESPIRATORY ASSESSMENT & RADIOLOGY

- Bedside Assessment of Pulmonary Function
- Imaging Studies
- Introduction to Pulmonary Diseases on Chest Radiograph

UNIT IV (7 Hours)

BLOOD GAS ANALYSIS & PFT LABORATORY

- Blood Gas Analysis
- Introduction to PFT Laboratory

UNIT V (6 Hours)

PULMONARY FUNCTION TESTING & INTERPRETATION

- Pulmonary Function Studies
- Interpretation of PFT Data

PRACTICAL / DEMONSTRATION

• Demonstration and practical sessions (Principles of Blood Gas Analysis, PFT Demonstrations, Chest X-ray Review, Arterial Line/ABP Monitoring Demonstration, ECG Practice, Spirometry and Body Plethysmography Demonstrations) – 10 Hours

ADDITIONAL TOPIC SUBSECTIONS (10 Hours)

(Linked to ABG and Physiology)

1. Basic Physical and Physiological Principles (Gas Exchange, Transport)
2. Hydrogen Ion Regulation in Fluids
3. Oxygen Transport and Measurement of Oxygen Content
4. Acid–Base Balance and Clinical Approach to Disturbances
5. Quality Control in Sampling and Calibration
6. Correction Factors in Blood Gas Analysis
7. Measurement of Hemoglobin and Saturation

(These topics are included within the ABG/PFT and Demonstration block above.)

Learning Outcomes

- Acquire competence in ABG sampling/interpretation and basic PFT interpretation.
- Read and interpret common chest radiograph findings relevant to respiratory disease.
- Recognize and respond to common ECG abnormalities and arterial/central venous monitoring data.

RTY403-PRINCIPLES OF MECHANICAL VENTILATION – I

L	T	P	C
2	1	0	3

UNIT I (5 Hours)

INTRODUCTION & BASIC PRINCIPLES OF MECHANICAL VENTILATION

- History of Mechanical Ventilation
- Negative Pressure Ventilation (Overview)
- Physical Principles of Mechanical Ventilation

UNIT II (6 Hours)

PHYSIOLOGICAL EFFECTS & RESPIRATORY FAILURE (6 HOURS)

- Physiological Effects of Positive Pressure Ventilation (PPV), Complications and Minimization Strategies
- Respiratory Failure and Indications for Mechanical Ventilation
- Indication and Assessment for Artificial Ventilation

UNIT III (6 Hours)

VENTILATOR SETTINGS & MODES

- Initiating and Adjusting Ventilator Settings
- Selecting Ventilator and Mode — Full/Partial Support, Targeting Control Variables, Closed-loop Strategies

UNIT IV (5 Hours)

MONITORING & HEART–LUNG INTERACTIONS

- Heart–Lung Interactions During Mechanical Ventilation
- Monitoring in Mechanical Ventilation — Airway Pressures, Compliance, Resistance, Airway Management

UNIT V (4 Hours)

RESPIRATORY FUNCTION ASSESSMENT & PRACTICAL DEMONSTRATION

1. Non-invasive Assessment of Respiratory Function — Indirect Calorimetry, Respiratory Mechanics

Practical / Demonstration (10 Hours)

- Ventilator Setup
- Ventilator Modes
- Patient Simulation
- Monitoring
- Troubleshooting
- Applied Ventilator Exercises

LEARNING OUTCOMES

- Explain ventilator hardware and control variables.
- Initiate basic ventilator support and titrate settings for oxygenation and ventilation goals.
- Monitor ventilator patients and troubleshoot alarms and complications.

L	T	P	C
2	1	0	4

APPLIED CARDIOPULMONARY ANATOMY & PHYSIOLOGY

Course Objectives

Students will be able to:

- Revise and apply anatomy and physiology relevant to respiratory and cardiopulmonary care.
- Integrate physiologic principles with monitoring, diagnostics and bedside procedures.

UNIT I (4 Hours)

ANATOMY OF RESPIRATION & AIRWAYS – I

- Anatomy of Respiration — Overview
- The Respiratory Tract — Structure and Divisions
- Conducting vs Respiratory Zone — Differences and Functions
- Respiratory Epithelium and Mucosa — Histology and Function

UNIT II (4 Hours)

ANATOMY OF RESPIRATION & AIRWAYS – II

- Upper Respiratory Tract — Nose, Pharynx, Larynx
- Lower Respiratory Tract — Trachea, Bronchi, Bronchioles, Alveoli
- Blood Supply of Lungs — Pulmonary and Bronchial Circulation
- Muscles of Respiration — Diaphragm, Intercostals, Accessory Muscles

UNIT III (6 Hours)

PHYSIOLOGY OF THE RESPIRATORY SYSTEM

- Mechanics of Breathing — Pressures, Compliance, Resistance
- Physiology of Gas Exchange — Diffusion, Partial Pressures, Membrane Factors
- Respiratory Volumes and Capacities — Tidal, Vital, Residual Volumes, Spirometry
- Respiratory Sounds — Normal and Abnormal Auscultation Findings
- External and Internal Respiration, Gas Transport — Oxygen/Carbon Dioxide Transport, Hemoglobin Role
- Control of Respiration — Central and Peripheral Chemoreceptors, Neural Control

UNIT IV (5 Hours)

CARDIOVASCULAR ANATOMY & PHYSIOLOGY – I (5 Hours)

- Anatomy of Heart — Gross Structure, Chambers, Valves
- Conduction System — SA/AV Nodes, Bundle Branches
- Blood Vessels and Circulation — Arteries, Veins, Capillaries, Microcirculation
- Cardiac Cycle — Phases, Heart Sounds, Pressure Changes
- Valve Function — Valve Mechanics and Clinical Relevance

UNIT V **(5 Hours)**

CARDIOVASCULAR ANATOMY & PHYSIOLOGY – II

1. Electrical Activity and ECG Basics — Electrical Vectors, Lead Basics
2. Cardiac Output — Determinants and Measurement Concepts
3. Coronary Circulation — Coronary Arteries, Ischemia Basics
4. Systemic Circulation — Peripheral Resistance, Distribution of Flow
5. Pulmonary Circulation — Pulmonary Vascular Physiology, V/Q Relations

PRACTICAL / DEMONSTRATION

• Bedside Anatomy Review
• Chest Auscultation Laboratory
• Waveform Correlation Sessions

LEARNING OUTCOMES

• Correlate anatomical structures with physiological function and clinical signs.

• Interpret auscultation findings and relate them to lung pathology and ventilator settings.

• Use applied physiology to guide basic respiratory interventions.

L T P C

BRT-004 Environmental Awareness(VAC) 1 0 0 1

COURSE OBJECTIVES

1. Understand environmental issues and sustainability concepts.
2. Learn the impact of environmental factors on health and society.
3. Study pollution, conservation, and waste management practices.
4. Promote environmental responsibility and sustainable living.

UNIT I:

Introduction to Environment and Ecosystems **(3 HOURS)**

- Environmental awareness and environmental education
- Ecosystems and biodiversity
- Types of ecosystems: Forests, oceans, wetlands
- Importance of biodiversity
- Threats to ecosystems and biodiversity
- Sustainability concepts and environmental protection

UNIT II:

Pollution and Climate Change **(3 HOURS)**

- Types of pollution: Air, water, soil, noise, and light pollution
- Causes and effects of pollution
- Pollution impact on health and ecosystems
- Climate change and global warming
- Greenhouse effect and human contributions
- Mitigation and adaptation strategies

UNIT III:

Resource Conservation and Sustainable Practices **(3 Hours)**

- Renewable and non-renewable resources
- Conservation of water, energy, and natural resources
- Sustainable agriculture and food systems
- Organic farming and agroecology
- Role of diet in environmental sustainability
- Green lifestyle practices

UNIT IV:

Waste Management and Water Conservation **(3 Hours)**

- Types of waste: Municipal, industrial, hazardous, electronic
- Biomedical and healthcare waste management
- 3 Rs: Reduce, Reuse, Recycle
- Composting, landfills, and incineration
- Water conservation and management practices
- Importance of clean water and sanitation

UNIT V:

Environmental Policies and Green Technologies **(3 Hours)**

- Environmental laws and regulations
- Paris Agreement and Kyoto Protocol
- Role of NGOs, governments, and individuals
- Renewable energy sources: Solar, wind, hydro
- Sustainable transportation and green technologies
- Individual and community participation in environmental protection

REFERENCE BOOK

- Environmental Science: A Global Concern

Vth Semester IIIrd Year

S.NO	SUBJECT CODE	SUBJECT	L	T	P	CL		MARKS		
							C	INT	EXT	TOTAL
1	RTY501	Biostatistics, Research Methodology & Ethics	2	1	0	0	3	30	70	100
2	RTY502	Critical Care & Advanced Cardiothoracic Respiratory Care (with ACLS)	3	2	0	1	6	30	70	100
3	RTY503	Neonatal & Pediatric Respiratory Care	2	2	1	1	6	30	70	100
4	RTY504	Clinical Practicum II	0	0	2	4	5	30	70	100
5	RTVAC005	Interpersonal communication	1	0	0	0	1	-	-	-
Total			8	5	2	6	21	120	280	400

L	T	P	C
2	0	0	3

FIFTH SEMESTER

RTY501-BIOSTATISTICS, ETHICS & PROFESSIONALISM

Course Objectives

Students will be able to:

- Understand medico-legal and ethical aspects of healthcare and respiratory practice.
- Apply basic biostatistics for data handling, interpretation and simple research design.
- Use standard computer tools for documentation, presentation and data processing.

UNIT I (5 Hours)

MEDICAL ETHICS & PROFESSIONALISM

1. **Medical Ethics & Medico-legal Aspects**
    - Principles of ethics
    - Patient rights
    - Confidentiality
    - Consent
    - Documentation
    - Medico-legal responsibilities
    - Consumer Protection Act
    - Reporting obligations
2. **Ethical & Legal Implications in Respiratory Care**
    - Scope of practice
    - Accountability (NCAHP guidelines)
    - Ethical dilemmas in respiratory therapy
    - NIV/MV ethics
    - DNR and end-of-life decisions
    - Legal implications of respiratory procedures

UNIT II (2 Hours)

COMPUTER APPLICATIONS & SCIENTIFIC DOCUMENTATION

1. **Basics of Computer Applications**
    - Windows basics
    - MS Word

- MS Excel
- MS PowerPoint
- Documentation tools

2. **Scientific Writing & Documentation**
    - Research protocol and thesis structure
    - IMRaD format
    - Referencing styles
    - Journal writing
    - Systematic reviews and meta-analysis
    - PRISMA/CONSORT basics

UNIT III **(4 Hours)**

BASIC BIOSTATISTICS

1. **Basics of Medical Statistics**
    - Types of data
    - Descriptive statistics
    - Sampling
    - Inferential statistics
    - Hypothesis testing
    - Chi-square test
    - t-test
    - Graphs and tables
    - p-value and confidence interval interpretation

UNIT IV **(9 Hours)**

BIOSTATISTICS IN HEALTH SCIENCES & EPIDEMIOLOGY

- **Role of Statistics in Health Sciences & Research**
    - Incidence and prevalence
    - Study designs
    - Sampling methods
    - Reliability and validity
    - Correlation

- Data analysis
- Research interpretation

Epidemiology Basics

- Disease occurrence
- Risk factors
- Disease transmission
- Outbreak investigation
- Screening tests
- Sensitivity and specificity

UNIT V **(4 Hours)**

SAFETY, WASTE MANAGEMENT & ICU INTRODUCTION

- **Biomedical Waste Management**
  - Waste categories
  - Segregation and colour coding
  - Infection control
  - PPE
  - Disposal standards
  - Legal regulations
- **Electricity & Electro-medical Equipment Safety**
  - Basics of electricity
  - Grounding
  - Shock hazards
  - Leakage current
  - Ventilator, monitor and HFNC safety
  - Preventive maintenance
  - ICU equipment safety
- **ICU Structure & Functions Introduction**
  - ICU layout and zones
  - Equipment overview
  - Respiratory therapist roles

- ICU workflow
- Rounds and handover protocol
- Safety practices

LEARNING OUTCOMES

• Apply basic statistical concepts in clinical data interpretation.

• Demonstrate ethical decision-making and medico-legal awareness in clinical practice.

• Prepare basic scientific documents and use office applications for presentations and data handling.

L	T	P	C
3	2	0	6

RTY 502-CRITICAL CARE & ADVANCED CARDIOTHORACIC RESPIRATORY CARE (WITH ACLS)

UNIT I (8 Hours)

SHOCK, TRAUMA & CARDIAC EMERGENCIES

- Shock (Hypovolaemic, Cardiogenic, Septic) — Pathophysiology and Inotropes/Vasopressors
- Intercostal Drainage Tubes — Technique and Management
- Chest Trauma Management in ICU
- ACLS (Advanced Cardiac Life Support) — CPR, Advanced Airway, Arrhythmia Management, Drugs, Post-resuscitation Care

UNIT II (7 Hours)

CARDIAC DISORDERS & VENTILATORY SUPPORT

- Major Adult Cardiac Disorders and Ventilator Concepts
- Major Pediatric Cardiac Disorders — Post-operative Care and Ventilator Management
- Mechanical Ventilation in Congestive Heart Failure

UNIT III (4 Hours)

PEDIATRIC, NEUROLOGICAL & RENAL CRITICAL CARE

- General Pediatric Disorders Requiring Ventilation
- Neurological Disorders — Ventilatory Implications
- Stroke — Respiratory Care Considerations
- Renal Failure and Hemodialysis — Ventilator Implications

UNIT IV (7 Hours)

ADVANCED RESPIRATORY CARE TECHNIQUES

- Respiratory Defense Mechanisms
- Prone Ventilation
- Liquid Ventilation and ECMO (Introduction)
- Bronchoscopy — Part 1

UNIT V (4 Hours)

ICU COMPLICATIONS & PATIENT MANAGEMENT

- Sedation and Paralysis in Mechanically Ventilated Patients

- Ventilator Associated Pneumonia (VAP) — Prevention and Management

LEARNING OUTCOMES

• Manage critical cardiothoracic emergencies and support advanced resuscitation measures.

• Understand ICU-level ventilator strategies for cardiac and neurological patients.

• Participate in bronchoscopy assistance and VAP prevention strategies.

L	T	P	C
2	2	1	6

RTY503-NEONATAL AND PAEDIATRIC RESPIRATORY CARE

Course Objectives

Students will be able to:

- Understand neonatal cardiorespiratory anatomy, physiology and special care needs.
- Implement neonatal respiratory support strategies including CPAP, HFOV and surfactant therapy.
- Provide neonatal resuscitation and manage neonatal ventilatory emergencies.

UNIT I (6 Hours)

NEONATAL ANATOMY, PHYSIOLOGY & THERMOREGULATION

- Neonatal Cardiorespiratory Anatomy and Physiology
- Thermoregulation in Newborn
- Fetal Circulation

UNIT II (6 Hours)

NEONATAL RESPIRATORY ASSESSMENT & OXYGEN THERAPY

- Neonatal Respiratory Disorders Overview
- Assessment of Oxygenation and Ventilation in Neonates
- Oxygen Therapy in Neonates

UNIT III (9 Hours)

NEONATAL VENTILATORY SUPPORT

- CPAP and Advanced Technologies
- Initiation of Mechanical Ventilation and Airway Management in Neonates
- HFOV and HFV in Neonates — Initiation, Monitoring, Adjustment and Wean-back

UNIT IV (7 Hours)

SURFACTANT THERAPY & NEONATAL RESPIRATORY DISORDERS

1. Weaning and Extubation in Neonates
2. Surfactant Replacement Therapy
3. Hyaline Membrane Disease / Respiratory Distress Syndrome (RDS)
4. Periodic Breathing and Neonatal Apnea
5. Bronchopulmonary Dysplasia and Transient Tachypnea of Newborn

UNIT V (2 Hours)

NEONATAL RESUSCITATION

Neonatal Resuscitation — NRP Principles

LEARNING OUTCOMES

• Identify neonatal respiratory pathologies and initiate age-appropriate respiratory support.

• Perform neonatal resuscitation and manage ventilator strategies specific to neonates.

• Monitor and adjust HFOV/HFV and interpret neonatal respiratory parameters.

BRTVAC 005- Interpersonal Communication (VAC)

L	T	P	C
1	0	0	1

COURSE OBJECTIVES

1. Develop effective verbal and non-verbal communication skills.
2. Enhance patient interaction and counseling abilities.
3. Improve teamwork and professional relationships.
4. Manage conflicts and emotional situations in healthcare settings.

UNIT I:

Introduction to Interpersonal Communication (3 Hours)

- Basics of interpersonal communication
- Communication process: Sender, receiver, message, feedback, noise
- Importance of communication in daily and professional life
- Verbal communication and language use
- Clarity, precision, and communication barriers

UNIT II:

Non-Verbal Communication and Listening Skills (3 Hours)

- Body language, gestures, posture, and facial expressions
- Space and touch in communication
- Emotional expression through non-verbal cues
- Types of listening: Active, passive, reflective
- Barriers to effective listening and empathy development

UNIT III:

Relationship Development and Conflict Management (3 Hours)

- Self-disclosure and relationship building
- Johari Window model
- Trust and intimacy in communication
- Types of conflict and conflict management styles
- Healthy conflict resolution strategies

UNIT IV:

Cultural and Workplace Communication (3 Hours)

- Cultural influences on communication
- Gender differences in communication
- Cross-cultural communication strategies
- Communication in workplace and healthcare settings

- Professional relationships, teamwork, and leadership communication

UNIT V:

Digital and Ethical Communication **(3 Hours)**

- Technology and digital communication
- Social media and interpersonal relationships
- Advantages and disadvantages of digital communication
- Ethics in communication
- Honesty, privacy, transparency, and professional boundaries

RECOMMENDED TEXT BOOK

- Interpersonal Communication: Everyday Encounters

IV th Year VIth Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P	CL	C	MARKS		
								INT	EXT	TOTAL
1	RTY601	Principles of Mechanical Ventilation – II (T&P)	3	0	1	0	5	30	70	100
2	RTY602	Pulmonary Rehabilitation & Sleep Medicine	3	0	1	1	6	30	70	100
3	RTY603	Research Project / Dissertation	1	0	0	1	3	30	70	100
4	RTY604	Clinical Practicum III	0	0	1	5	6	30	70	100
Total			7	0	3	7	20	120	280	400

SIXTH SEMESTER

L	T	P	C
3	0	1	5

RTY601-PRINCIPLES OF MECHANICAL VENTILATION – II

Course Objectives

Students will be able to:

- Manage advanced monitoring, modes and disease-specific applications of mechanical ventilation.
- Apply protective strategies, recruitment maneuvers, weaning protocols and complication management.
- Understand NIV, pediatric NIV, home ventilation and medico-legal/ethical aspects of assisted ventilation.

UNIT I (7 Hours)

ADVANCED MONITORING IN MECHANICAL VENTILATION

- **Monitoring in Mechanical Ventilation**
  - Capnography
  - SpO_2 Monitoring
  - Airway Pressures
  - Chest Inspection
  - Blood Gases
  - Transcutaneous Monitoring
- **Hemodynamic Monitoring**
  - Arterial Line
  - CVP Monitoring
  - Pulmonary Artery Catheter
  - PCWP
  - Cardiac Output
  - SvO_2 Interpretation
- **Modes of Ventilation**
  - Conventional Modes
  - Dual Control Modes
  - APRV
  - NAVA
  - BiLevel Ventilation
- **PEEP Therapy Principles**
  - Physiological Basis
  - Indications
  - Benefits and Complications

UNIT II (9 Hours)

VENTILATOR GRAPHICS & PATIENT MANAGEMENT

- **Managing the Ventilated Patient**
  - Troubleshooting
  - Ventilator Optimization
  - Fluid Management
  - Electrolyte Balance
  - Nutritional Considerations
- **Protective Lung Ventilation Strategies**
  - Lung Protective Ventilation
  - Low Tidal Volume Strategy
  - Prevention of Ventilator-induced Lung Injury
- **Lung Recruitment Strategies**
  - Recruitment Maneuvers
  - Indications
  - Monitoring Response

UNIT III (10 Hours)

DISEASE-SPECIFIC VENTILATION & AIRWAY CARE

- **Pathophysiology & Management**
  - Respiratory Pathophysiology
  - Ventilator Management Principles

- **Disease-specific Applications**
- ARDS
  - COPD
  - Neuromuscular Disorders
  - Congestive Heart Failure
  - Interstitial Lung Disease

- **Independent Lung Ventilation**
  - Principles
  - Indications

- **Percutaneous Dilatational Tracheostomy (PDT)**
  - Technique
  - Indications
  - Tracheostomy Care
  - Complications

UNIT IV (8 Hours)

WEANING, PHARMACOTHERAPY & ETHICAL ISSUES

- **Care of Ventilator Accessories & Infection Prevention**
  - Cleaning and Maintenance
  - Infection Control Practices
- **Pharmacotherapy in Mechanical Ventilation**
  - Steroids
  - Neuromuscular Blockers
  - Sedation
  - Analgesia
- **Aerosol Therapy During Mechanical Ventilation**
  - Nebulization Techniques
  - Drug Delivery Optimization
- **Weaning Strategies**
  - Spontaneous Breathing Trial (SBT)
  - RSBI
  - Tracheostomy Weaning
  - Long-term Weaning
- **Withholding & Withdrawing Ventilator Support**
  - Ethical Considerations
  - End-of-life Care

Troubleshooting Ventilator Alarms & Limits
- Alarm Recognition
- Immediate Interventions

UNIT V (11 Hours)

OUTCOME ASSESSMENT & NON-INVASIVE VENTILATION

- **Assessment of Outcome of Mechanical Ventilation & Transport of Ventilated Patients**
  - Outcome Assessment
  - Patient Transport Safety
  - Transport Ventilation
- **Non-invasive Ventilation**
- NIV Equipment
  - NIV Modes
  - Patient–Ventilator Synchronization
  - Pediatric NIV
  - Quality Control
  - Disease-specific NIV Application
  - Home Ventilation
  - Monitoring and Complications
  - Medico-legal Aspects

PRACTICAL / DEMONSTRATION (20 Hours)

- Hands-on Ventilator Sessions
- Waveform Interpretation Workshops
- PDT Demonstration
- Transport Simulation
- NIV Setup
- Weaning Simulations

LEARNING OUTCOMES

- Implement advanced ventilator strategies, interpret ventilator graphics and manage complications.
- Apply weaning protocols and ethical decision-making for long-term ventilation.
- Set up and manage NIV in different clinical contexts including pediatric and home setting

RTY602-PULMONARY REHABILITATION & SLEEP MEDICINE

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Course Objectives

Students will be able to:
- Understand and implement core components of pulmonary rehabilitation (PR).
- Design nutritional and educational interventions for chronic respiratory patients.
- Set up, perform and interpret sleep studies and basics of sleep lab technology.

UNIT I (7 Hours)

INTRODUCTION TO PULMONARY REHABILITATION

- Historical Perspective of Pulmonary Rehabilitation
- Basic Concepts and Definition of Pulmonary Rehabilitation
- Selection and Assessment of Chronic Respiratory Disease Patients
- Therapeutic Interventions

UNIT II (5 Hours)

HEALTH EDUCATION & SPECIAL REHABILITATION PROGRAMS (5 HOURS)

- Tobacco Dependence
- Patient and Family Education in Health Management
- Pediatric Pulmonary Rehabilitation
- Rehabilitation in Non-COPD Lung Disease

UNIT III (7 Hours)

ADVANCED REHABILITATION & PROCEDURES (7 HOURS)

- Rehabilitation for Long-term Tracheostomized Patients
- Bronchoscopy and BAL – Part 2
- Thoracoscopy

UNIT IV (8 Hours)

PULMONARY FUNCTION TESTING & INTERPRETATION (8 HOURS)

- Assessment and Interpretation of Pulmonary Function Studies
- Pre-operative PFTs and Bedside Assessment
- Spirometry — Lung Volume Interpretation
- Measurement of DLCO

UNIT V (9 Hours)

SLEEP MEDICINE & ADVANCED PULMONARY DIAGNOSTICS

- Sleep Disorders in Pulmonary Patients
- Spirometry and Body Plethysmography
- Setting up a Sleep Laboratory
- Technological Advances in Sleep Study and Management

PRACTICAL / DEMONSTRATION (20 Hours)

- Pulmonary Rehabilitation Assessment Sessions
- Breathing Exercise and Ventilatory Muscle Training Demonstrations
- Smoking Cessation Counseling Practice
- Bronchoscopy and BAL Demonstrations
- Thoracoscopy Demonstration
- PFT and Spirometry Interpretation Sessions
- DLCO Measurement Demonstration
- Body Plethysmography Demonstration
- Sleep Study Setup and Monitoring Demonstration
- Sleep Laboratory Equipment Handling and Interpretation Sessions

LEARNING OUTCOME

- Perform patient selection and build tailored PR programs including education and smoking cessation support.
- Conduct and interpret spirometry, DLCO and basic sleep study outputs.
- Participate in bronchoscopy/BAL assistance and thoracoscopy observation

FOURTH YEAR – INTERNSHIP PROGRAM

VIIth and VIIIth semester

Component	Details
Program	Bachelor of Science in Respiratory Technology (B.Sc. RT)
Academic Year	Fourth Year
Component	One-Year Compulsory Internship
Duration	12 Months (Full-Time)
Eligibility	Successful completion of all theory and practical examinations of the first three years of the program
Supervision	Conducted under qualified Respiratory Technology faculty and consultants in recognized tertiary care teaching hospitals

Description

The compulsory internship is designed to provide immersive, hands-on clinical experience in multiple healthcare settings. During this period, students consolidate the knowledge and skills acquired in the previous three years and develop independent professional competencies. Interns function as junior members of the Respiratory Technology team, participating in direct patient care, procedural assistance, equipment management, and interdisciplinary collaboration.

Internship Objectives

By the end of the internship, students will be able to:

1. Perform patient assessment, initiate and monitor Respiratory Technology procedures independently.

2. Manage ventilated patients under supervision, including invasive and non invasive modes.

3. Participate in airway management, resuscitation, and emergency interventions.

4. Conduct and interpret diagnostic tests such as PFTs, ABG analysis, and sleep studies.

5. Implement pulmonary rehabilitation and home-care planning.

6. Exhibit professional ethics, teamwork, and effective communication.

.7. Demonstrate readiness for independent clinical practice or advanced postgraduate training.

Internship postings

- **Medical Intensive Care Unit (MICU)**
  - Ventilator management
  - Airway care
  - Oxygen therapy
  - Patient monitoring
- **Surgical Intensive Care Unit (SICU)**
  - Postoperative respiratory management
  - Extubation protocols
  - Respiratory assessment in surgical patients
- **Neonatal & Pediatric Intensive Care Units (NICU/PICU)**
  - Neonatal ventilation
  - Surfactant therapy
  - Non-invasive respiratory support
  - Pediatric airway management
- **Emergency Medicine & Trauma Unit**
  - Airway management
  - CPR and resuscitation
  - Acute respiratory distress management
  - Emergency ventilatory support
- **Pulmonary Medicine / Pulmonary Function Test (PFT) Laboratory**
  - Spirometry
  - Diffusion studies
  - Bronchial challenge tests
  - Pulmonary function assessment
- **Cardiothoracic & Neurocritical Care Units**
  - Advanced mechanical ventilation
  - Hemodynamic monitoring
  - Respiratory care in cardiac and neurological patients
- **Sleep Medicine & Polysomnography Unit**

- Sleep study setup
- Polysomnography scoring
- Report interpretation
- PAP titration studies

Operation Theatres / Anesthesia Services

- Preoperative ventilatory assessment
- Intraoperative respiratory monitoring
- Postoperative ventilatory care
- Airway equipment handling

Pulmonary Rehabilitation & Home Care Services

- Breathing retraining exercises
- Patient and family education
- Home oxygen therapy
- Pulmonary rehabilitation techniques

Research / Academic Projects

- Clinical data collection
- Literature review
- Research methodology
- Manuscript and presentation preparation

BOOK REFERENCES

Subject	Standard References
Respiratory Care & Critical Care	*Egan's Fundamentals of Respiratory Care* – Scanlon, Wilkins, Stoller *Clinical Application of Mechanical Ventilation* – David Chang *Mechanical Ventilation: Physiological and Clinical Applications* – Susan Pilbeam *Respiratory Physiology: The Essentials* – J.B. West *Principles and Practice of Mechanical Ventilation* – Tobin *The ICU Book* – Marino *Intensive Care Medicine* – Irwin & Rippe
Respiratory Physiology & Pathophysiology	*Textbook of Respiratory Medicine* – John F. Murray & Jay A. Nadel *Applied Respiratory Physiology* – J.F. Nunn
Pharmacology	*Essentials of Medical Pharmacology* – Tripathi *Basic and Clinical Pharmacology* – Katzung
Anatomy & Physiology	*Gray's Anatomy* – Williams et al. *Textbook of Medical Physiology* – Guyton & Hall *Human Anatomy* – B.D. Chaurasia
Microbiology & Pathology	*Medical Microbiology* – Michael A.P. Faller & Patrick R. Murray *Basic Pathology* – Lakhani et al.
Community Medicine & Psychology	*Textbook of Preventive and Social Medicine* – Park *Introduction to Psychology* – Morgan & King
Pulmonary Rehabilitation & Physical Therapy	*Pulmonary Rehabilitation: The Team Approach* – Hodgkin, Wilkins & Lopez *Principles and Practice of Cardiopulmonary Physical Therapy* – Donna Frownfelter & Elizabeth Dean *Essentials of Cardiopulmonary Physical Therapy* – Hillegas
Neonatal Respiratory Care	*Textbook of Neonatology* – Avery *Care of the Newborn* – Meharban Singh