MALLA REDDY VISHWAVIDYAPEETH

Suraram X Roads,
Jeedimetla, Hyderabad-
500055

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

Program:

(Master of Science)

M.Sc., Respiratory Technology

COURSE STRUCTURE

2026

Vision

To produce highly skilled respiratory technologists who deliver advanced respiratory care, promote patient safety, contribute to research, and improve cardiopulmonary health outcomes through evidence-based practice.

Mission

- Provide advanced clinical knowledge and hands-on training in respiratory and critical care technology.
- Develop competency in respiratory diagnostics, mechanical ventilation, pulmonary rehabilitation, and critical care management.
- Promote research, innovation, leadership, and interdisciplinary collaboration in respiratory sciences.
- Encourage ethical practice, lifelong learning, and patient-centered healthcare delivery.

Program Educational Objectives (PEOs)

Graduates will:

- Apply advanced respiratory care knowledge in critical care and pulmonary settings.
- Deliver safe and effective respiratory therapy for adult, pediatric, and neonatal patients.
- Conduct research and apply evidence-based respiratory care practices.
- Demonstrate leadership, teaching, and professional ethics in healthcare environments.
- Contribute to pulmonary rehabilitation, disease prevention, and community respiratory health programs.

Program Outcomes (POs)

Students will:

- Understand advanced respiratory and cardiopulmonary concepts.
- Assess and manage patients with complex respiratory disorders.
- Apply mechanical ventilation and advanced airway management techniques.
- Interpret ABGs, pulmonary function tests, sleep studies, and radiological findings.
- Conduct clinical research and analyze scientific data.
- Communicate effectively with patients, caregivers, and multidisciplinary healthcare teams.
- Practice ethical, professional, and patient-centered respiratory care.
- Utilize modern respiratory equipment and evidence-based technologies.
- Participate in quality improvement and patient safety initiatives.
- Engage in lifelong learning and professional development.

Program Specific Outcomes (PSOs)

Students can:

- Perform advanced respiratory assessment and cardiopulmonary monitoring.
- Manage invasive and non-invasive mechanical ventilation independently.
- Conduct pulmonary function testing, polysomnography, and respiratory diagnostics.
- Participate in emergency airway management and critical care interventions.
- Plan and implement pulmonary rehabilitation and respiratory education programs.
- Conduct clinical and research activities in respiratory and critical care sciences.

Course Outcomes (COs)

Students will:

- Understand advanced respiratory care principles and clinical applications.
- Assess respiratory status using diagnostic and monitoring techniques.
- Apply ventilatory support and oxygen therapy appropriately in critical care settings.
- Interpret ABGs, spirometry, imaging, and sleep study findings accurately.
- Implement infection control, patient safety, and quality assurance practices.
- Develop advanced clinical, communication, counseling, teaching, and research skills.

I st year I st Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P/CL	TOTAL HOURS	C	MARKS		
								INT	EXT	TOTAL
1	MSC RTY101	Leadership & Administration	1	1	3	5	3	30	70	100
2	MSC RTY102	Research Methods & Biostatistics	2	1	-	3	3	30	70	100
3	MSC RTY103	Pulmonary Rehabilitation	2	2	3	7	5	30	70	100
4	MSC RTY104	Quality & Patient Safety	2	1	3	6	4	30	70	100
5	MSC RTY105	Clinical Practicum I	-	-	15	15	5	30	70	100
Total			7	5	24	36	20	150	350	500

I[st] Year IInd Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P/CL	TOTAL HOURS		MARKS		
							C	INT	EXT	TOTAL
1	MSC RTY201	Teaching & Learning in Health Professions	2	-	6	8	4	30	70	100
2	MSC RTY202	Cardiopulmonary Physiology & Trauma Care	2	-	6	8	4	30	70	100
3	MSC RTY203	Evidence-Based Respiratory Care & Presentation Skills – I	3	-	-	3	3	30	70	100
4	MSC RTY204	Advanced Mechanical Ventilation	2	1	3	6	4	30	70	100
5	MSC RTY205	Clinical Practicum II	-	-	12	15	5	30	70	100
Total			9	1	27	37	20	150	350	500

IInd Year IIIrd Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P/CL	TOTAL HOURS	C	MARKS		
								INT	EXT	TOTAL
1	MSC RTY301	Case Management	2	-	6	8	4	30	70	100
2	MSC RTY302	Polysomnography	1	1	3	5	3	30	70	100
3	MSC RTY303	Critical Care Medicine – I	2	1	3	6	4	30	70	100
4	MSC RTY304	Advanced Procedures	1	1	6	8	4	30	70	100
5	MSC RTY305	Clinical Practicum III	-	-	12	12	5	30	70	100
Total			6	3	30	39	20	150	350	500

IInd Year IVth semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P/CL	TOTAL HOURS	C	MARKS		
								INT	EXT	TOTAL
1	MSC RTY401	Evidence-Based Respiratory Care & Presentation Skills – II	2	-	9	-	5	30	70	100
2	MSC RTY402	Critical Care Medicine – II	2	-	9	-	5	30	70	100
3	MSC RTY403	Thesis / Dissertation	-	-	-	9	3	30	70	100
4	MSC RTY404	Clinical Practicum IV	-	-	21	-	7	30	70	100
Total			4	-	39	9	20	120	280	400

1.1 Post Graduate Programme

Sl. No.	Course	Duration	Eligibility for admission
1	M.Sc. Respiratory Technology	2 years	He/she has passed the B.Sc. in Respiratory Technology or equivalent examination of a recognized Indian University or a duly constituted Board with pass marks (50%).

1.2 Medium of Instruction:

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

1.3 Duration of the Course

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

1.4 Examination Regulations

1.4.1 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.

1.4.2 Internal Assessments:

a) Regular periodic assessment shall be conducted throughout the course. In each semester there will be two one-hour internal assessments (15 marks each) and a continuous assessment (10 marks). Thus, a total of 40 marks for the internal exam. (i.e. weightage for internal assessment shall be 40% of the total marks in each subject).

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

(a) Short questions 3 nos. each carrying 5 marks (i.e. 3 × 5 = 15 marks). Two such internal examinations will be conducted.

(b) Continuous assessment of the student will be done. Students' overall attendance, performance in class, behaviour of the student, presentations, extra-curricular activities etc. will be assessed. Continuous assessment carries 10 marks.

(c) Thus, a total of 40 marks for the internal examination (15 + 15 + 10 = 40 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 internal examination will be conducted. The assessment comprises 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.

1.4.3 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 those subjects without practical examination (60 marks) will be:

(a) Three essay questions out of which the student should answer 2 questions each carrying 10 marks (i.e. 2 × 10 = 20 marks).

(b) Eight short note questions out of which the student should attempt six questions, each carrying 5 marks (6 × 5 = 30 marks).

(c) Ten very short questions each carrying 1 mark (i.e. 10 × 1 = 10 marks).

Thus, a total of 60 marks.

d) The question pattern for practical examination includes spotters, major practical, minor practical, case presentation, viva, practical, and log record.

The minimum pass for internal assessment is 40% and for the University Examination is 50%. i.e. a student should score a total of 50% (adding the internal and external examination) to pass in each subject.

I^st year I^st semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P/CL	TOTAL HOURS	C	MARKS		
								INT	EXT	TOTAL
1	MSC RTY101	Leadership & Administration	1	1	3	5	3	30	70	100
2	MSC RTY102	Research Methods & Biostatistics	2	1	-	3	3	30	70	100
3	MSC RTY103	Pulmonary Rehabilitation	2	2	3	7	5	30	70	100
4	MSC RTY104	Quality & Patient Safety	2	1	3	6	4	30	70	100
5	MSC RTY105	Clinical Practicum I	-	-	15	15	5	30	70	100
Total			7	5	24	36	20	150	350	500

I Year- 1st Semester **SYLLABUS**

MSC RTY101Leadership & Administration **L-1/T-1/P-3/C-3**

Course Outcomes (COs)

- At the end of the course, the student will be able to:
- Explain the principles and theories of leadership and administration in healthcare organizations.
- Apply communication, teamwork, and motivational strategies in respiratory care settings.
- Demonstrate knowledge of healthcare operations, financial management, and organizational development.
- Develop strategic planning and problem-solving skills for effective healthcare management.

Program Outcomes (POs)

- After completion of MSc Respiratory Technology program, the graduates will be able to:
- Apply advanced respiratory care knowledge in clinical and healthcare management settings.
- Demonstrate leadership, ethical practice, and professional responsibility in multidisciplinary healthcare teams.
- Utilize research, critical thinking, and evidence-based practices in respiratory care.

Learning Objectives

The course is designed to enable students to:

- Understand concepts and theories of leadership and administration.
- Develop managerial and operational skills in healthcare organizations.
- Learn effective communication and relationship-building techniques.
- Understand financial management and strategic planning in healthcare.
- Improve decision-making and problem-solving abilities.
- Facilitate teamwork, motivation, and staff development.
- Apply leadership principles to respiratory care services and healthcare delivery systems.

Unit-1 **(10 hours)**

Foundations of Leadership

- Leadership: An Elusive Concept
- Cultivating the Leadership Relationship
- Building Commitment: Getting Others to Follow

Unit-2

Organizational Development & Operations **(10 hours)**

- Learning Organization: The Roots of an Organization
- Operations: The Trunk of an Organization
- Communicating with Clarity

Unit-3

Strategic Management & Facilitation **(8 hours)**

- Strategic Priorities: The Branches of an Organization
- The Art of Effectively Facilitating Processes

Unit-4

Financial Management & Value Creation **(08 hours)**

- Financial Health: The Taproot of an Organization
- Value Creation: The Leaves and Blossoms of an Organization

Unit-5

Performance, Staff Development & Future Leadership **(08 hours)**

- Getting Results
- Developing Others
- Conclusion: Leading in the Future

Practicals / Activities (recommended) **(8 hours)**

• Case studies on healthcare teams, simulated leadership exercises, SWOT & strategic plan workshop

Learning Outcomes

• Apply leadership models to healthcare teams, develop strategic priorities, manage operations and finances, and coach staff for performance.

MSC RTY102 Biostatistics & Research Methodology L-2/T-1/P/C-3

Course Outcomes (COs)

- Explain the principles and concepts of biostatistics and research methodology.
- Formulate research problems and design appropriate research studies in respiratory care.
- Apply sampling methods, data collection techniques, and statistical analysis in clinical research.
- Interpret research findings and prepare scientific reports and technical documents.
- Demonstrate ethical principles, plagiarism awareness, and research governance in healthcare research.
- Develop research proposals, funding applications, and evidence-based research projects.

Program Outcomes (POs)

- Apply advanced scientific and clinical knowledge in respiratory care practice.
- Utilize research methodology and statistical tools for evidence-based decision-making.
- Demonstrate ethical conduct and professional responsibility in clinical research and healthcare practice.
- Communicate scientific information effectively through technical writing and presentations.
- Analyze healthcare data critically to improve patient care and clinical outcomes.
- Engage in lifelong learning, innovation, and interdisciplinary research activities.

Learning Objectives

- Understand the fundamentals of research methodology and biostatistics.
- Learn different research designs, sampling methods, and hypothesis testing.
- Develop skills in data collection, analysis, interpretation, and report writing.
- Understand research ethics, plagiarism, and international research guidelines.
- Gain knowledge about project management, research grants, and funding agencies.
- Use statistical software and evidence-based approaches in respiratory care research.
- Improve scientific communication and technical writing skills.

Unit-1

Fundamentals of Research Methodology (06 hours)

- Fundamentals of Research: Research Methodology – An Introduction
- Defining the Research Problem
- Research Design and Sampling Design

Unit-2

Measurement, Data Collection & Sampling **(06 hours)**

- Measurement and Scaling Techniques
- Methods of Data Collection and Processing & Analysis of Data
- Sampling Fundamentals

Unit-3 **(08 hours)**

Hypothesis Testing & Research Reporting

- Testing of Hypotheses (Parametric and Non-Parametric Tests)
- Interpretation and Report Writing
- Literature Survey and Documentation
- Data Collection, Analysis and Hypothesis

Unit-4

Research Ethics & Technical Writing **(06 hours)**

- Research Ethics, Plagiarism and Impact of Research
- Technical Writing and Reporting of Research
- Measurement and Scaling Techniques

Unit-5

Research Management & International Guidelines **(04 hours)**

- Project Cost Management
- Funding Agencies and Research Grants
- Declaration of Helsinki

Practicals / Activities **(8 hours).**

• Hands-on sessions: sample size calculation, use of statistical software (SPSS/R), critical appraisal of articles, grant summary exercise

Learning Outcomes

• Design a research study, choose appropriate statistical tests, analyse data, write a research protocol and address ethics and funding pathways**.**

MSC RTY103 Pulmonary Rehabilitation L-2/T-2/P-3/C-5

Course Outcomes (COs)

- Explain the principles, components, and benefits of pulmonary rehabilitation programmes.
- Assess and select suitable candidates for pulmonary rehabilitation.
- Perform functional capacity assessment and develop individualized exercise training programmes.
- Provide patient education and collaborative self-management strategies for chronic respiratory diseases.
- Evaluate psychological and nutritional status and implement appropriate interventions.
- Measure patient-centred outcomes and apply disease-specific pulmonary rehabilitation approaches.

Program Outcomes (POs)

- Apply advanced clinical knowledge and skills in pulmonary rehabilitation practice.
- Demonstrate competency in patient assessment, therapeutic intervention, and outcome evaluation.
- Utilize evidence-based approaches for improving respiratory health and quality of life.
- Communicate effectively with patients, caregivers, and multidisciplinary healthcare teams.
- Promote ethical, safe, and patient-centred respiratory care services.
- Engage in continuous professional development and research in respiratory rehabilitation.

Learning Objectives

- Understand the concepts and scope of pulmonary rehabilitation.
- Learn methods for selecting and assessing pulmonary rehabilitation candidates.
- Develop skills in functional capacity assessment and exercise prescription.
- Understand patient education and self-management strategies in chronic respiratory diseases.
- Gain knowledge about psychological and nutritional assessment in pulmonary rehabilitation.
- Evaluate evidence-based outcomes and disease-specific rehabilitation approaches.
- Improve clinical decision-making and interdisciplinary rehabilitation skills.

Unit-1 **(06 hours)**

Introduction to Pulmonary Rehabilitation

- Overview of Pulmonary Rehabilitation
- Selecting and Assessing
- Pulmonary Rehabilitation Candidate

Unit-2

Functional Assessment & Training **(08 hours)**

- Functional Capacity Assessment and Training
- Collaborative Self-Management and Patient Education

Unit-3 **(08 hours)**

Psychological & Nutritional Intervention

- Psychological Assessment and Intervention
- Nutritional Assessment and Intervention

Unit-4 **(04 hours)**

Outcome Measures in Pulmonary Rehabilitation

- Patient-Centred Evidence-Based Outcome

Unit-5 **(04 hours)**

Disease-Specific Pulmonary Rehabilitation

- Disease-Specific Approaches in Pulmonary Rehabilitation

Practicals / Demos

• Functional capacity testing (6MWT, ISWT), psychosocial assessment role plays, nutritional screening. (12 hours recommended).

Learning Outcomes

• Assess PR candidates, prescribe individualized nutrition plans, provide education and measure outcomes.

MSC RTY104

Quality & Patient Safety L-2/T-1/P-3/C-4

Course Outcomes (COs)

- Explain the concepts, principles, and frameworks of quality and patient safety in healthcare.
- Apply quality measurement tools and approaches in respiratory care practice.
- Analyze structure, process, and outcome measures for evaluating healthcare quality.
- Utilize health-related quality of life (QOL) tools in respiratory diseases such as COPD and asthma.
- Design and implement quality improvement projects in healthcare settings.
- Interpret quality and patient safety outcomes to improve clinical practice and patient care.

Program Outcomes (POs)

- Apply evidence-based practices to improve quality and patient safety in respiratory care.
- Demonstrate critical thinking and problem-solving skills in healthcare quality management.
- Utilize quality assessment tools and data analysis for clinical decision-making.
- Communicate effectively within multidisciplinary healthcare teams for quality improvement initiatives.
- Promote ethical, safe, and patient-centred healthcare practices.
- Engage in lifelong learning and continuous quality improvement in respiratory technology.

Learning Objectives

- Understand concepts and dimensions of healthcare quality and patient safety.
- Learn methods and approaches for measuring healthcare quality.
- Develop knowledge of quality indicators, process mapping, and outcome evaluation.
- Understand quality of life assessment tools used in respiratory diseases.
- Gain skills in administering, scoring, and interpreting QOL questionnaires.
- Learn strategies for conducting quality improvement and patient safety projects.
- Improve analytical and decision-making skills related to healthcare quality management.

Unit-1

Concepts of Quality in Healthcare (12hours)

- Measurements of the Quality of Health Care
- Quality of Care: Definition
- Quality and Resource Constraints

Unit-2 **(12hours)**

Quality Measurement Approaches

- Approaches to Quality Measurement
- Advances in Quality Measurement Structure, Process, and Outcome
- Measures of Care Quality

Unit-3 **(04hours)**

Quality Measures in Research

- Approaches to Developing or Selecting Measures of Care Quality for a Research Project

Unit-4

Health-Related Quality of Life in Respiratory Diseases **(08 hours)**

- Health-Related Quality of Life in Different Disease Conditions – COPD, Asthma
- Quality-of-Life for Respiratory Illness Questionnaire (QOL-RIQ): A Disease-Specific Quality-of-Life Questionnaire for Patients with Mild to Moderate Chronic Non-Specific Lung Disease

Unit-5 **(08 hours)**

Quality of Life Assessment & Interpretation

- Quality of Life: Assessment, Analysis and Interpretation

Practicals / Activities **(8 hours)**

• QOL questionnaire administration & scoring, process mapping, root cause analysis

Learning Outcomes

• Use quality measures and QOL tools, design quality improvement projects, and interpret outcomes to inform practice

I[st] Year IInd Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P/CL	TOTAL HOURS	C	MARKS		
								INT	EXT	TOTAL
1	MSC RTY201	Teaching & Learning in Health Professions	2	-	6	8	4	30	70	100
2	MSC RTY202	Cardiopulmonary Physiology & Trauma Care	2	-	6	8	4	30	70	100
3	MSC RTY203	Evidence-Based Respiratory Care & Presentation Skills – I	3	-	-	3	3	30	70	100
4	MSC RTY204	Advanced Mechanical Ventilation	2	1	3	6	4	30	70	100
5	MSC RTY205	Clinical Practicum II	-	-	12	15	5	30	70	100
Total			9	1	27	37	20	150	350	500

Ist year IInd semester **L-2/T/P-6/C-4**

MSC RTY201-Teaching & Learning in Health Professions

Course Outcomes (COs)

- Explain the principles and concepts of teaching and learning in health professions education.
- Apply competency-based and outcome-based educational approaches in curriculum planning.
- Develop learning objectives, competencies, and effective teaching strategies for healthcare education.
- Utilize student-centred, problem-based, and interprofessional teaching methods in clinical education.
- Design assessment tools and evaluate learner performance effectively.
- Demonstrate skills in curriculum mapping, educational planning, and continuous professional development.

Program Outcomes (POs)

- Apply educational principles and teaching methodologies in healthcare and respiratory care education.
- Demonstrate leadership, communication, and teamwork in academic and clinical teaching environments.
- Utilize evidence-based and competency-based approaches in professional education.
- Assess learner performance and provide constructive feedback for improvement.
- Promote ethical, student-centred, and lifelong learning practices in health professions education.
- Engage in curriculum development, educational innovation, and professional growth.

Learning Objectives

- Understand the role and qualities of an effective healthcare teacher.
- Learn basic educational principles and competency-based education approaches.
- Develop skills in curriculum planning, sequencing, and curriculum mapping.
- Understand outcome-based learning and methods for specifying competencies.
- Gain knowledge of student-centred, clinical problem-based, and interprofessional education methods.
- Learn different teaching styles and assessment strategies in health professions education.
- Improve communication, teamwork, and educational leadership skills.

UNIT I

Foundations of Teaching & Professional Development (12 Hours)

- The Teacher is Important
- Faces of a Good Teacher
- Basic Educational Principles
- Being an Enthusiastic & Passionate Teacher
- Collaborating & Working as a Team
- Checking Performance & CPD

UNIT II

Outcome & Competency-Based Education (8 Hours)

- Move to Outcome/Competency-Based Approach
- Specifying Learning Outcomes & Competencies
- Communicating Learning Outcomes & Competencies
- Implementing Outcome-Based Approach

UNIT III

Curriculum Planning & Development (8 Hours)

- The "Authentic" Curriculum (Practical Learning)
- Ten Questions when Planning Curriculum
- Sequencing & Spiral Curriculum
- Educational Environment & Curriculum Mapping

UNIT IV

Student-Centred & Clinical Education (6 Hours)

- Student Engagement & Student-Centred Approach
- Building Learning around Clinical Problems
- Interprofessional Education, Apprenticeship, Community-Based Education

UNIT V

Teaching Methods & Assessment (4 Hours)

- Styles of Teaching
- Assessment — Theory & Practice

Practicals / Activities

• Microteaching sessions, OSCE/assessment design workshop, curriculum mapping exercise (8 hours).

Learning Outcomes

• Design competency-based modules, perform microteaching, create assessments aligned to outcomes, and implement student-centred teaching.

MSC RTY202 -Cardiopulmonary Physiology and Trauma care L-2/T/P-6/C-4

Course Outcomes (COs)

- Explain developmental anatomy and cardiopulmonary physiology across different age groups.
- Describe mechanisms of ventilation, gas exchange, acid-base balance, and control of respiration.
- Interpret pulmonary function tests and ECG findings in clinical practice.
- Analyze the effects of exercise, aging, altitude, and high-pressure environments on the cardiopulmonary system.
- Apply principles of initial trauma assessment and emergency airway management.
- Demonstrate knowledge of management approaches for thoracic, abdominal, spinal, pediatric, and thermal trauma.

Program Outcomes (POs)

- Apply advanced respiratory care knowledge in clinical and emergency healthcare settings.
- Demonstrate competency in cardiopulmonary assessment and trauma management.
- Utilize critical thinking and evidence-based approaches in patient care.
- Communicate effectively with healthcare teams during emergency and critical care situations.
- Practice ethical, safe, and patient-centred respiratory care.
- Engage in lifelong learning and professional development in respiratory technology.

Learning Objectives (LOs)

- Understand developmental anatomy and neonatal respiratory physiology.
- Learn the physiological principles of ventilation, gas transport, and acid-base regulation.
- Develop skills in pulmonary function assessment and ECG interpretation.
- Understand cardiopulmonary adaptations to exercise and environmental changes.
- Gain knowledge of trauma life support principles and emergency management.
- Learn assessment and management of various traumatic injuries affecting different body systems.

UNIT I (17 Hours)

Developmental & Respiratory Physiology

- Developmental Anatomy and Physiology
- Neonatal Respiratory Physiology
- Respiratory Physiology: Ventilation
- Pulmonary Function Measurements
- The Diffusion of Pulmonary Gases
- Oxygen and Carbon Dioxide Transport

- Acid-Base Balance and Regulation

UNIT II **(8 Hours)**

Ventilation, Cardiac Physiology & Environmental Effects

- Ventilation-Perfusion Relationships
- Control of Ventilation
- Aging and the Cardiopulmonary System
- Electric Conduction of the Heart
- ECG and Interpretation
- Exercise and its Effect on the Cardiopulmonary System
- High Altitude and its Effect on Cardiopulmonary System
- High Pressure Environment and its Effect on Cardiopulmonary System

UNIT III **(6 Hours)**

Initial Trauma Assessment & Emergency Management

- ITLS: Initial Assessment and Management
- Airway and Ventilatory Management
- Shock

UNIT IV **(8 Hours)**

Major Trauma Management

- Thoracic Trauma
- Abdominal and Pelvic Trauma
- Head Trauma
- Spine and Spinal Cord Trauma

UNIT V **(6 Hours)**

Specialized Trauma Care

- Musculoskeletal Trauma
- Thermal Injuries
- Pediatric Trauma

Practicals / Activities **(12 hours).**

• ECG workshops, ABG & acid-base lab, trauma simulation & airway drills, exercise physiology testing (12 hours).

Learning Outcomes

• Interpret advanced cardiopulmonary physiology, manage acute trauma airways and circulation, and apply ITLS algorithms.

MSC RTY203-Evidence-Based Respiratory Care & Presentation Skills – I L-3/T/P/C-3

Course Outcomes (COs)

- Explain the principles of evidence-based respiratory care and scientific literature appraisal.
- Critically analyze journal articles related to respiratory care, critical care, trauma, and neonatal care.
- Interpret research findings and apply evidence-based practices in clinical respiratory care.
- Develop presentation and communication skills for academic and clinical discussions.
- Demonstrate the ability to summarize, evaluate, and present scientific articles effectively.
- Integrate current evidence into respiratory therapy decision-making and patient care.

Program Outcomes (POs)

- Apply evidence-based knowledge in respiratory care and clinical practice.
- Demonstrate critical thinking and analytical skills in evaluating scientific literature.
- Communicate scientific and clinical information effectively through presentations and discussions.
- Utilize research evidence to improve patient care and healthcare outcomes.
- Practice ethical and professional behaviour in academic and clinical environments.
- Engage in lifelong learning and continuous professional development in respiratory technology.

Learning Objectives (LOs)

- Understand the principles of evidence-based practice in respiratory care.
- Learn methods for reviewing and critically appraising journal articles.
- Develop skills in scientific presentation and academic communication.
- Gain knowledge of recent advances in respiratory care, critical care, trauma, and neonatal respiratory management.
- Improve interpretation of research data and clinical applicability of evidence.
- Enhance confidence in presenting and discussing scientific literature.

Evidence-Based Respiratory Care & Presentation Skills – I (24hours)

- Journal article from Critical Care
- Journal article from Respiratory Technology
- Journal article from Respiratory Technology
- Journal article from Trauma and emergency
- Journal article from IJRC
- Journal article from Neonatal Respiratory Care

MSC RTY204 Advanced Mechanical Ventilation L-2/T-1/P-3/C-4

Course Outcomes (COs)

- Explain the historical development and principles of mechanical ventilation.
- Describe conventional, noninvasive, alternative, and unconventional modes of ventilatory support.
- Apply advanced ventilatory strategies in special clinical settings and critically ill patients.
- Analyze the physiological effects and complications associated with mechanical ventilation.
- Demonstrate knowledge of artificial airway management and patient monitoring during ventilatory support.
- Evaluate adjunctive therapies and neonatal ventilation techniques in respiratory care practice.

Program Outcomes (POs)

- Apply advanced respiratory care knowledge and ventilatory management skills in critical care settings.
- Demonstrate competency in selecting and managing mechanical ventilation strategies.
- Utilize evidence-based approaches for improving patient outcomes in ventilated patients.
- Communicate effectively with multidisciplinary healthcare teams in intensive care environments.
- Practice ethical, safe, and patient-centred respiratory care.
- Engage in lifelong learning and professional development in advanced respiratory therapy.

Learning Objectives (LOs)

- Understand the evolution and principles of mechanical ventilation.
- Learn different modes and methods of ventilatory support.
- Develop skills in monitoring and managing mechanically ventilated patients.
- Understand complications and physiological effects associated with ventilatory support.
- Gain knowledge of airway management and adjunctive respiratory therapies.
- Learn neonatal ventilation strategies and advanced respiratory support techniques.

Unit I **(14 Hours)**

Fundamentals of Mechanical Ventilation

- Historical perspective on ventilation
- Conventional ventilatory support methods
- Physiological effects of mechanical ventilation

Unit II **(16 Hours)**

Advanced and Noninvasive Ventilatory Support

- Advanced ventilatory modes including VAPS, PAV, NAVA, and ASV
- Noninvasive ventilatory support methods
- Unconventional ventilatory techniques

Unit III

Mechanical Ventilation in Special Settings

- Ventilatory support in special settings including ECMO interface and thoracic surgery
- Adjunctive therapies including inhaled vasodilators, recruitment maneuvers, and nitric oxide therapy

Unit IV

Artificial Airways and Patient Monitoring

- Artificial airways and airway management
- Monitoring of ventilated patients
- Complications in ventilated patients

Unit V

Management of Ventilated Patients

- Weaning from mechanical ventilation
- Ventilator weaning protocols
- Comprehensive management of mechanically ventilated patients

Practicals / Demonstrations

• Ventilator simulator workshops, waveform analysis labs, non-invasive ventilation trials, bedside ventilator management simulations (20 hours).

Learning Outcomes

- • Select and manage advanced ventilatory modes, interpret monitoring data, and manage complications and adjunctive therapies

IInd Year IIIrd Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P/CL	TOTAL HOURS	C	MARKS		
								INT	EXT	TOTAL
1	MSC RTY301	Case Management	2	-	6	8	4	30	70	100
2	MSC RTY302	Polysomnography	1	1	3	5	3	30	70	100
3	MSC RTY303	Critical Care Medicine – I	2	1	3	6	4	30	70	100
4	MSC RTY304	Advanced Procedures	1	1	6	8	4	30	70	100
5	MSC RTY305	Clinical Practicum III	-	-	12	12	5	30	70	100
Total			6	3	30	39	20	150	350	500

IInd Year IIIrd Semester

MSC RTY301-Case Management L-2/T/P-6/C-4

Course Outcomes (COs)

- Explain the concepts, principles, and evolution of case management practice.
- Describe the roles and responsibilities of a case manager in healthcare settings.
- Apply interpersonal, communication, and information-gathering skills in case management.
- Demonstrate specialized practice skills for respiratory therapy case management.
- Evaluate case management interventions and outcomes in diverse patient populations.
- Identify challenges and future perspectives in healthcare case management practice.

Program Outcomes (POs)

- Apply advanced respiratory care and case management principles in clinical practice.
- Demonstrate leadership, communication, and coordination skills in multidisciplinary healthcare teams.
- Utilize evidence-based approaches for patient-centred care and healthcare management.
- Practice ethical, safe, and professional behaviour in healthcare delivery.
- Analyze healthcare challenges and develop effective patient management strategies.
- Engage in lifelong learning and continuous professional development in respiratory care.

Learning Objectives (LOs)

- Understand the evolution and importance of case management in healthcare.
- Learn the roles and functions of case managers in respiratory care services.
- Develop interpersonal, assessment, and coordination skills for effective patient management.
- Gain knowledge of specialized case management practices and interventions.
- Understand case management approaches for special populations and complex healthcare conditions.
- Explore challenges, innovations, and future trends in case management practice.

Case Management

- The Evolution of Case Management Practice
- Overview of Case Management Practice
- The Roles of a Case Manager
- An Example of Case Management
- Case Management Skills
- Interpersonal, Connecting, and Information-Gathering Skills
- Specialized Practice Skills
- Additional Components of Case Management Intervention and Evaluation
- RT Case Management
- Case Management Issues with Special Populations
- Challenges and Visions

Practicals / Activities **(12 hours).**

• Case studies, discharge planning simulations, community resource mapping

Learning Outcomes

• Lead case management activities, coordinate multidisciplinary care, and evaluate outcomes.

MSC RTY302 Polysomnography L-1/T-1/P-3/C-3

Course Outcomes (COs)

- Explain the anatomy, physiology, and sleep patterns across the life cycle.
- Identify and evaluate common sleep disorders using sleep assessment tools and questionnaires.
- Demonstrate knowledge of polysomnography instrumentation and home sleep study procedures.
- Interpret and score adult and pediatric sleep studies accurately.
- Apply therapeutic approaches including PAP therapy, sleep hygiene, and cognitive behavioural therapy.
- Prepare and interpret polysomnography reports for clinical decision-making.

Program Outcomes (POs)

- Apply advanced knowledge and technical skills in sleep medicine and respiratory care.
- Demonstrate competency in diagnostic and therapeutic procedures related to sleep disorders.
- Utilize evidence-based approaches for assessment and management of sleep-related disorders.
- Communicate effectively with patients and multidisciplinary healthcare teams.
- Practice ethical, safe, and patient-centred care in sleep laboratories and clinical settings.
- Engage in lifelong learning and professional development in respiratory and sleep medicine.

Learning Objectives (LOs)

- Understand normal sleep physiology and sleep changes across different age groups.
- Learn methods for assessing and diagnosing sleep disorders.
- Develop skills in polysomnography instrumentation, scoring, and interpretation.
- Gain knowledge of PAP therapy and behavioural treatment approaches for sleep disorders.
- Understand the role of sleep hygiene and cognitive behavioural therapy in insomnia management.
- Improve clinical documentation and report generation skills in sleep studies.

UNIT I (6 Hours)

Fundamentals of Sleep & Patient Care

- Sleep across Life Cycle
- Anatomy and Physiology Pertaining to Sleep
- Patient Care and Education

UNIT II **(10 Hours)**

Sleep Assessment & Diagnostic Studies

- Sleep Questionnaires
- Sleep Disorders
- Polysomnography Instrumentation
- Home Sleep Studies
- Scoring of Sleep Studies — Adult and Paediatric

UNIT III **(6 Hours)**

Therapeutic Management of Sleep Disorders

- Treatment of Sleep Disorders
- PAP Therapy
- Sleep Hygiene

UNIT IV **(6 Hours)**

Behavioural Therapy in Sleep Medicine

- Cognitive Behavioural Therapy
- Cognitive Behavioural Therapy in Insomnia
- Psychiatric Disorders of Sleep and Treatment

UNIT V **(2 Hours)**

Reporting & Interpretation

- Report Generation

Practicals **(20 hours)**

• Hemodynamic monitoring labs, ICU transport simulation, advanced CPR/ACLS scenarios (20 hours).

Learning Outcomes

• Manage ICU monitoring systems, transport, resuscitation and ARDS protocols in multidisciplinary teams.

MSC RTY303 Critical Care Medicine I L-2/T-1/P-3/C-4

Course Outcomes (COs)

- Explain the principles of ICU organization, patient transport, and critical care management.
- Demonstrate knowledge of shock, hemodynamic monitoring, and cardiovascular assessment.
- Interpret monitoring parameters related to oxygenation, respiratory status, and organ dysfunction.
- Apply advanced CPR, cardiac pacing, and emergency cardiovascular management techniques.
- Analyze respiratory emergencies including ARDS, airway obstruction, pneumonia, and pleural disorders.
- Integrate multidisciplinary critical care approaches for managing critically ill patients.

Program Outcomes (POs)

- Apply advanced critical care knowledge and respiratory therapy skills in ICU settings.
- Demonstrate competency in monitoring, resuscitation, and emergency patient management.
- Utilize evidence-based approaches in critical care decision-making and patient safety.
- Communicate effectively within multidisciplinary critical care teams.
- Practice ethical, safe, and patient-centred care in intensive care environments.
- Engage in lifelong learning and professional development in critical care medicine.

Learning Objectives (LOs)

- Understand ICU design, organization, and transport of critically ill patients.
- Learn principles of shock, cardiovascular monitoring, and hemodynamic assessment.
- Develop skills in oxygenation monitoring, respiratory monitoring, and emergency interventions.
- Gain knowledge of advanced CPR, cardiac pacing, and acute cardiac care.
- Understand management of acute respiratory failure, ARDS, and pulmonary complications.
- Improve critical thinking and multidisciplinary teamwork in ICU patient management.

UNIT I (10 Hours)

ICU Organization & Hemodynamic Monitoring

- ICU Design & Organization
- Transport of Critically Ill
- Shock — Overview
- Hemodynamic Monitoring
- Multiple Organ Dysfunction Syndrome

UNIT II **(10 Hours)**

Oxygenation & Cardiovascular Emergencies

- Monitoring Oxygenation
- Lactic Acidosis
- Acute Cardiac Syndromes (Investigations & Interventions)
- Cardiovascular Monitoring
- Adult CPR (Advanced)

UNIT III **(6 Hours)**

Cardiac Disorders & Interventions (6 Hours)

- Cardiac Pacing & ICDs
- Acute Heart Failure
- Valvular & Congenital Heart Disease

UNIT IV **(4 Hours)**

Respiratory Monitoring & Failure

- Respiratory Monitoring
- Upper Airway Obstruction & Acute Respiratory Failure

UNIT V **(6 Hours)**

ARDS & Pulmonary Complications

- ARDS
- Airflow Limitation, Pneumonia, Atelectasis & Pleural Problems

Practicals **(20 hours).**

• Hemodynamic monitoring labs, ICU transport simulation, advanced CPR/ACLS scenarios (20 hours).

Learning Outcomes

• Manage ICU monitoring systems, transport, resuscitation and ARDS protocols in multidisciplinary teams.

MSC RTY304 Advanced Procedures **L-1/T-1/P-6/C-4**

Course Objective

Provide hands-on procedural skills essential for advanced respiratory practice including vascular access, airway management, chest procedures, imaging interpretation, advanced pulmonary function testing, polysomnography, and life support techniques.

Course Outcomes (COs)

- Demonstrate competency in arterial and venous access procedures used in respiratory and critical care settings.
- Perform chest procedures and bronchoscopic sampling techniques safely under supervision.
- Interpret chest imaging including chest X-ray, lung ultrasound, and CT chest findings.
- Apply advanced pulmonary function testing and polysomnography techniques in clinical practice.
- Demonstrate advanced airway management and life support skills including BLS and ACLS.
- Assist in advanced critical care procedures such as ECMO and multidisciplinary respiratory interventions.

Program Outcomes (POs)

- Apply advanced respiratory care knowledge and procedural skills in critical care environments.
- Demonstrate competency in diagnostic, therapeutic, and emergency respiratory procedures.
- Utilize evidence-based approaches and clinical reasoning in patient management.
- Communicate effectively within multidisciplinary healthcare teams during advanced procedures.
- Practice ethical, safe, and patient-centred care in respiratory therapy settings.
- Engage in lifelong learning and continuous professional development in advanced respiratory practice.

Learning Objectives (LOs)

- Understand principles and techniques of vascular access and airway management.
- Learn chest procedures and bronchoscopic sampling methods.
- Develop skills in imaging interpretation and advanced pulmonary diagnostics.
- Gain practical knowledge of polysomnography and pulmonary function testing.
- Learn advanced life support techniques including BLS, ACLS, and ECMO basics.
- Improve procedural safety, patient monitoring, and clinical decision-making skills.

UNIT I **(10 Hours)**

Vascular Access & Chest Procedures

- Arterial Puncture for ABG
- Arterial Cannulation
- Venous Cannulation (Central/Peripheral)
- Chest Tube Insertion, Aspiration, Repositioning & Removal

UNIT II **(14 Hours)**

Bronchoscopy & Imaging Interpretation

- Bronchoscopic Sampling — BAL, Endobronchial Brushing
- Chest X-ray Interpretation
- Lung Ultrasound — Focused Lung US
- CT Chest (Interpretation & Protocols)

UNIT III **(10 Hours)**

Pulmonary Diagnostics & Sleep Studies

- PFT Basic & Advanced
- Polysomnography (Practical)

UNIT IV **(15 Hours)**

Airway & Life Support Techniques

- Airway Management Techniques (Advanced)
- Basic Life Support (Refresher & Assessment)
- Advanced Cardiac Life Support

(5 Hours)

UNIT V

ECMO & Advanced Respiratory Support

- Extracorporeal Membrane Oxygenation (ECMO) — Overview & Basics

Practicals

- Arterial and venous cannulation practice
- Chest tube insertion and management demonstrations
- Bronchoscopic sampling procedures
- Chest X-ray, CT chest, and lung ultrasound interpretation sessions

- Advanced pulmonary function testing and polysomnography practice
- Airway management, BLS, ACLS, and ECMO simulation training

Learning Outcomes

- Perform bedside procedural skills safely and effectively.
- Obtain diagnostic respiratory samples using appropriate techniques.
- Interpret imaging findings and advanced PFT/PSG reports accurately.
- Assist in ECMO and advanced life support procedures under supervision.
- Apply procedural safety and patient-centred care during advanced respiratory interventions.

II nd Year IVth Semester

S.NO	SUBJECT CODE	SUBJECT	L	T	P/CL	TOTAL HOURS	C	MARKS		
								INT	EXT	TOTAL
1	MSC RTY401	Evidence-Based Respiratory Care & Presentation Skills – II	2	-	9	-	5	30	70	100
2	MSC RTY402	Critical Care Medicine – II	2	-	9	-	5	30	70	100
3	MSC RTY403	Thesis / Dissertation	-	-	-	9	3	30	70	100
4	MSC RTY404	Clinical Practicum IV	-	-	21	-	7	30	70	100
Total			4	-	39	9	20	120	280	400

MSC RTY401-Evidence-Based Respiratory Care & Presentation Skills – II L-2/T/P-9/C-5

Course Description

This course emphasizes journal reading, critical appraisal, and professional presentation skills. It aims to enhance students' ability to interpret current research evidence in respiratory care and effectively communicate findings through oral and poster presentations.

Course Objectives

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

- Critically read and interpret respiratory care research articles.
- Present journal reviews effectively in academic and professional forums.
- Develop confidence in oral and poster presentations.

Evidence-Based Respiratory Care & Presentation Skills – II (Total Hours: 45)

- Introduction to Evidence-Based Respiratory Care – Recap of Key Principles
- Journal Selection and Literature Search (PubMed, Google Scholar)
- Components of a Research Article – IMRaD Structure
- Critical Reading and Appraisal of Journal Articles
- Preparing Journal Presentations – Format, Slides, Summary Writing
- Oral Presentation Techniques and Scientific Communication
- Poster Preparation and Presentation Practice
- Peer Review, Group Discussions, and Feedback Sessions

References

1. Straus S.E. et al. Evidence-Based Medicine: How to Practice and Teach EBM.

2. Guyatt G. et al. Users' Guides to the Medical Literature.

3. Selected articles from Respiratory Care Journal, Chest, Critical Care Medicine, and ATS Journals.

MSC RTY402 Critical Care Medicine II **L-2/T/P-9/C-5**

Course Objective

Advanced critical care topics emphasizing multi-system organ support, complex monitoring, and ICU nutrition and metabolic care.

Course Outcomes (COs)

- Explain the pathophysiology and management of multi-organ dysfunction in critically ill patients.
- Demonstrate knowledge of neurological, renal, cardiovascular, and metabolic monitoring in ICU settings.
- Apply evidence-based approaches for management of sepsis, trauma, poisoning, and respiratory emergencies.
- Interpret electrolyte, acid-base, and hemodynamic abnormalities in critical care patients.
- Integrate nutritional support and fluid management strategies in ICU patient care.
- Develop comprehensive care plans for complex critically ill patients using multidisciplinary approaches.

Program Outcomes (POs)

- Apply advanced critical care and respiratory management skills in intensive care settings.
- Demonstrate competency in monitoring and management of multi-organ dysfunction.
- Utilize evidence-based clinical decision-making in critically ill patient care.
- Communicate effectively within multidisciplinary healthcare teams.
- Practice ethical, safe, and patient-centred critical care management.
- Engage in lifelong learning and professional development in critical care medicine.

Learning Objectives (LOs)

- Understand the management of renal, neurological, cardiovascular, and metabolic disorders in ICU patients.
- Learn advanced monitoring techniques used in critical care medicine.
- Develop skills in managing trauma, sepsis, poisoning, and respiratory emergencies.
- Gain knowledge of fluid therapy, acid-base balance, and nutritional management in ICU care.
- Understand invasive monitoring systems and organ support modalities.
- Improve multidisciplinary critical care planning and clinical decision-making skills.

UNIT I **(16 Hours)**

Renal, Neurological & Obstetric Critical Care

- Acute & Chronic Renal Failure
- Neurological Monitoring & Neuromuscular Syndromes
- Stroke, Meningitis & Encephalitis
- Obstetric Intensive Care

UNIT II **(16 Hours)**

Metabolic Disorders, Sepsis & Trauma (16 Hours)

- Electrolyte Disturbances & DIC
- Drowning & Sedation Considerations
- Sepsis & Shock, Poisoning
- Trauma: Multiple Trauma & TBI

UNIT III **(4 Hours)**

Fluid & Acid-Base Management

- Fluid Management
- Acid-Base Abnormalities

UNIT IV **(10 Hours)**

Pulmonary & Cardiovascular Emergencies

- Haemoptysis & Pulmonary Embolism
- Pericardial Tamponade & Pulmonary Hypertension

UNIT V **(2 Hours)**

Gastrointestinal & Nutritional Critical Care

- Pancreatitis, Acute Hepatic Failure, Nutrition in ICU

Practicals / Activities

- Multi-organ simulation scenarios
- ECMO and CRRT interface demonstrations
- Nutrition rounds in ICU settings
- Invasive monitoring laboratory sessions
- Case discussions on complex ICU patients

Learning Outcomes

- Manage multi-organ critical illness effectively in ICU settings.
- Integrate monitoring systems and organ support modalities in patient care.
- Develop comprehensive care plans for complex critically ill patients.
- Apply multidisciplinary approaches in advanced critical care management.

MSCRTY-403 Research Project / Thesis

Each M.Sc. Respiratory Technology candidate shall complete a supervised research project during the second year of the program with formal presentation and dissertation submission.

Learning Objectives

- Develop research skills in respiratory and critical care practice.
- Learn research methodology, study design, data collection, and statistical analysis.
- Understand ethical considerations in clinical research.
- Enhance scientific writing, dissertation preparation, and presentation skills.

Learning Outcomes

Students will be able to:

- Design and conduct an independent research study.
- Analyze and interpret research data using scientific methods.
- Present research findings in a structured scientific format.
- Apply research outcomes to improve evidence-based clinical practice.

In Project / Thesis, the Students Should be Able to: (90 Hours)

- Independently conduct research activities.
- Critically analyze findings using scientific methodology.
- Perform literature review and data interpretation.
- Prepare dissertation reports and scientific presentations.
- Demonstrate ethical and professional research practices.

Logbook & Clinical Competency

Students shall maintain a procedural logbook documenting clinical competencies and practical skills acquired during the training period.

The logbook should include minimum required procedures and faculty sign-offs for:

- Arterial Blood Gas (ABG) sampling
- Airway suctioning
- Ventilator setup and management
- Pulmonary Function Tests (PFTs)
- Polysomnography (PSG) procedures
- Chest tube assistance
- Arterial and venous access under supervision
- Oxygen therapy administration
- Non-invasive ventilation procedures

- Airway management techniques

The logbook must be regularly verified and signed by supervising faculty members and submitted during the final practical examination.