

Course Details – CMIV Course

Program Name: - Certificate in Mechanics of Intubation & Ventilation (CMIV)

1	Name of the Program	Certificate in Mechanics of Intubation & Ventilation
2	Program Code	CMIV
3	Program Pattern (Semester/Final)	Final
4	Program Duration	3 Months
5	Program Level	Certificate
6	Program Type	Full Time for regular students (Offline) & Parttime for In service candidates (Online)
		Theory – Online Classes Practical – Hands on training at centers for 2 hour daily thrice in a week for regular mode students whereas 3 Personal contact program each of 2 days every Month (8 hours/day) for Part time mode students
7	Program Total Credits	Nil
8	Program Total Marks	450
9	Program Passing Marks	210 (45% As per Table B)
10	Mode of Learning (Regular/ Part time Learning)	Regular / Distance for part time mode Students
11	Medium of Instructions	English
12	Medium of Examination	English
13	Eligibility	The students with following educational qualification will be eligible for seeking admission to this course : MBBS, BAMS, BHMS
14	Lecturer/Professor Qualification	The teaching faculties with following educational qualification will be eligible to teach this course : MBBS, MD (Med), Fellowship in Critical Care MBBS, MD (Pul. Med), MBBS, MD (Anesthesia) BAMS, MD with Experience of ICU
15	Program Objectives	The course aims to provide the hands-on training related to tracheal intubation and mechanical ventilation.
16	Program Outcome	Student will be up-skilled for technical operation of tracheal intubation and mechanical ventilation. This will provide the trained manpower for the critical care units. Students will get employment in critical care units and emergency departments
17	No. of Days @ Week	3 Days
18	Internship Duration	15 Days
19	Study Center	Online + Refer to the list of Centers in Main Menu
20	Course Fees	Rs. 15,000/- (Fifteen Thousand only)

Syllabus & Course Content with Hourly Teaching Plan

Certificate in Mechanics of Intubation & Ventilation		
Sr. No.	SUBJECT CODE	SUBJECT TITLE
1	CMIV - 101	Principles of Intubation & Mechanical Ventilation
2	CMIV - 102	Monitoring of Ventilation & Hemodynamic Analysis
3	CMIV - 103	Management of Mechanical Ventilation & Pharmacotherapy

Sub Code	Subjects	Teaching hours per week (3 Days @ Week)	Tutorial (*T)/ Practical / Activity(*P/*A) per week		Theory		Practical		Subject Total		No. of Credits
							(Practical/ Diss. / Viva/ Oral/ Test/ Sessional etc.)		(in case of joint passing)		
			T	P/A	Max	Passing	Max	Passing	Max	Passing	A + B
CMIV 101		3	1	1	100	45	50	25	150	70	2
CMIV 102		3	1	1	100	45	50	25	150	70	2
CMIV 103		3	1	1	100	45	50	25	150	70	2
Total		09	03	03	300	135	150	75	450	210	6

Question Paper Pattern

EXAMINATION - Theory (Multiple Choice Questions)

PROGRAMME NAME - Certificate in Mechanics of Intubation & Ventilation

SUBJECT TITLE _____ (Course Code- _____)

[TIME: 3 Hours] TOTAL: 100 Marks

Note- 1. Attempt Section A and Section B Only

2. Write answers to each question in proportion to the mark allotted

3. Available both **online** as well as **offline** mode

SECTION – A

Que – 25 MCQ (2 Marks each)

[2 x 25 = 50]

SECTION – B

Que- 25 MCQ (2 Marks each)

[2 x 25 = 50]

PRACTICAL

Viva Voce

(50 Marks)

Paper – 1
Principles of Intubation & Mechanical Ventilation
(Theory – 100 Marks + Oral Viva – 50 Marks)

Module No.	Sub Topics	Hours	Credit
Module No. 1 (Theory)	Airway Resistance	1 hr	
	Factors causing airway resistance		
	Effects on Ventilation and Oxygenation		
	Lung Compliance	1 hr	
	Static & dynamic Compliance & Measurement		
	Compliance and work of Breathing		
	Effects on Ventilation and Oxygenation		
	Dead space Ventilation	1 hr	
	Anatomic Dead space, Physiologic dead space , Alveolar dead space		
	Ventilatory Failure	1 hr	
	Hypoventilation		
	Ventilation/Perfusion (V/Q) mismatch		
	Intrapulmonary Shunting		
	Oxygenation Failure	1 hr	
	Hypoxemia and Hypoxia		
	Clinical Conditions leading to Mechanical Ventilation	1 hr	
	Depressed Respiratory Drive		
	Excessive Ventilatory workload		
	Failure of Ventilatory pump		
	Effects of Positive Pressure Ventilation (Airway Pressure, Compliance & Titration)	1 hr	
	Use of Continuous Positive Pressure Ventilation (CPAP) [Sleep Apnoea]	1 hr	
	Use of Bilevel Positive Pressure Ventilation (BiPAP)	1 hr	
	Common interfaces for CPAP & Bilevel PAP (Nasal Mask Facial Mask, Nasal Pillows & Problems)	1 hr	
	Endotracheal Intubation (Indications, Procedure , Complications)	1 hr	
	Tracheostomy (Indications, Procedure , Complications)	1 hr	
	Acid Base Balance (Respiratory acidosis/Alkalosis, Metabolic acidosis/Alkalosis)	1 hr	
Electrolyte Balance (Sodium Potassium Balance)	1 hr		

	Fluid Balance (Distribution of body water, Signs of ECF deficit/Excess, treatment of extracellular fluid abnormalities)	1 hr	
	Nutrition (Total calorie, protein requirement)	1 hr	
A	Hours And Credit	16 hrs	1.5

Paper – 2

Monitoring of Ventilation & Hemodynamic Analysis

(Theory – 100 Marks + Oral Viva – 50 Marks)

Module No.	Sub Topics	Hours	Credit
Module No. 2 (Theory)	Indications of Mechanical Ventilation		
	Acute /Impending Ventilatory failure, Severe Hypoxemia, Prophylactic support	1 hr	
	Initial Ventilatory Settings		
	Mode, Rate, Tidal Volume, FiO ₂ , PEEP, I:E Ratio, Flow Pattern	1 hr	
	Ventilatory Alarm Settings (Low Exhaled volume Alarm, Low/High Inspiratory Pressure Alarm, Apnea alarm, High Respiratory Rate alarm, High and low FiO ₂ Alarms)	1 hr	
	Hazards (Types, Barotrauma, Decrease in Cardiac output and Blood Pressure)	1 hr	
	Vital Signs (Heart Rate, Blood Pressure, Respiratory Rate, Temperature)	1 hr	
	Chest Inspection & Auscultation	1 hr	
	Fluid Balance And Anion Gap		
	Arterial Blood Gases	1 hr	
	Oxygen Saturation Monitoring (Pulse Oximetry)	1 hr	
	Transcutaneous Blood Gas Monitoring (Transcutaneous PO ₂ , PCO ₂)	1 hr	
	Hemodynamic Monitoring	1 hr	
	Arterial Catheter (Arterial Pressure, Pulse pressure, Complications)	1 hr	
Central Venous Catheter (Insertion, Waveform and CVP measurement)	1 hr		
Pulmonary Arterial Catheter	1 hr		

	Calculated Hemodynamic Values (Stroke Volume, Index, O ₂ consumption, Index, Pulmonary and Systemic Vascular resistance)	1 hr	
	Monitoring of Mixed Venous Oxygen Saturation	1 hr	
	Basic ventilatory Waveforms Analysis		
	Flow Waves in Positive Pressure Ventilation (Flow time waveform, Pressure -time waveform, Assist Control Mode of Ventilation, PEEP, Volume Waveforms)	1 hr	
	Spontaneous Ventilation during Mechanical Ventilation (Synchronized intermittent Mechanical Ventilation mode, Continuous positive Airway Pressure Mode)	1 hr	
	Effects of Flow Circuit & Lung Characteristics on waveforms (Transit Airway Pressure P _{ta} , Alveolar Pressure)	1 hr	
	Effects of lowering of Flow During Volume Controlled Ventilation (Effects on Tidal Volume etc)	1 hr	
	Waveforms developed during Pressure controlled Mode		
	Pressure Support and Spontaneous mode of Ventilation	1 hr	
	Pressure Volume and Flow volume loops	1 hr	
	Using waveforms for patient and Ventilatory System Assessment	1 hr	
	Using the Expiratory Flow and Pressure Waves as Diagnostic Tool	1 hr	
	Trouble Shooting in Ventilatory Settings	1 hr	
A	Total Hours And Credit	24 hrs	1.5

Paper – 3

Management of Mechanical Ventilation & Pharmacotherapy

(Theory – 100 Marks + Oral Viva – 50 Marks)

Module No.	Sub Topics	Hours	Credit
Module No. 1 (Theory)	Strategies to improve Ventilation	1 hr	
	Increase mechanical rate		
	Increase spontaneous tidal volume /rate		
	Increase mechanical tidal volume		
	Permissible hypercapnia		
	Strategies to improve	1 hr	
	Increase Inspired Oxygen Fraction (FiO ₂)		

Improve circulation & maintain normal Hb level	
Initiate Continuous Positive Airway Pressure (CPAP)	
Initiate Positive End Expiratory Pressure (PEEP)	
Inverse Ration Ventilation (IRV)	
Extra Carporeal Membrane Oxygenation (ECMO)	
Trouble shooting of common ventilatory Alarms	1 hr
Low & High pressure Alarm	
Low & High Respiratory Rate Alarm	
Low & High PEEP Alarm	
Low Expired Volume Alarm	
Auto PEEP	
Care of The Ventilatory Circuit	1 hr
Circuit Compliance & Circuit Patency	
Humidity & Temperature	
Frequency of circuit change	
Care of The Artificial Airway	1 hr
Patency of the endotracheal tube	
Humidification	
Removal of Secretions and Infection Control	
Pharmacotherapy For Ventilation	
Neuromuscular Blocking agents	1 hr
Sedative and Antianxiety Agents	1 hr
Narcotic Analgesics	1 hr
Anti Seizure Agents	1 hr
Drugs for improving Ventilation	1 hr
Weaning From Mechanical Ventilation	
Patient condition before weaning	
Weaning Criteria (Ventilatory criteria, Oxygenation Criteria, Pulmonary Reserve, Pulmonary Measurements)	1 hr
Combined Weaning Indices (Respiratory Frequency to tidal volume ratio (f/Vt), Simplified weaning indices, Compliance Rate Oxygenation and Pressure (CROP) index	1 hr
Weaning Procedure (T-tube weaning, SIMV, Pressure Support Ventilation)	1 hr
Signs of weaning failure	1 hr
Causes of weaning failure (Increase Air flow resistance, Decrease of compliance, Respiratory muscle fatigue)	1 hr
Weaning Success	
Neonatal Ventilation	

	Pressure limited, Time cycled ventilation	1 hr	
	Ventilatory circuit and humidifiers	1 hr	
	High Frequency Ventilation (Positive Pressure, Jet Ventilation & Oscillatory Ventilation)	1 hr	
	Home Mechanical Ventilation		
	Indication & Patient Selection	1 hr	
	Equipment Selection	1 hr	
	Total Hours And Credit	20 hrs	1.5

Hours And Credits Summary of The Course

Sr.	Course Details	Hours	Credits
1	Theory	60	4
2	Internship	30	2
	Total	90	6