PH.D. PRE-COURSE WORK EXAMINATION SYLLABUS

Paper II: Recent Advances in Respiratory Care Technology

Sr. No.	Topic	Details	Hours
1	Advanced Mechanical Ventilation	- Adaptive support ventilation (ASV) - Neurally adjusted ventilatory assist (NAVA) - Airway pressure release ventilation (APRV) - Automated weaning protocols and closed-loop systems - *Post-extubation management strategies*	3
2	High-Flow Nasal Cannula Therapy	- Physiological effects and mechanisms of action - Clinical applications in acute and chronic respiratory failure - Comparison with non-invasive ventilation	3
3	Extracorporeal Life Support	- VV-ECMO for severe ARDS - VA-ECMO for cardiogenic shock - ECCO2R techniques and indications - Advances in ECMO technology and management ***ECMO in candidate for lung transplant***	3
4	Pulmonary Diagnostics and Monitoring	- Advanced pulmonary function testing techniques ***(Spirometer, DLCO, BodyBox, ISO, FeNO, Bronchoprorocution test)*** - Esophageal pressure monitoring and transpulmonary pressure - Electrical impedance tomography (EIT) - Volumetric capnography and dead space measurement	3
5	Aerosol Medicine and Delivery Devices	- Smart nebulizers and adaptive aerosol delivery - Nanoparticle-based inhaled therapeutics - Advances in dry powder inhalers and soft mist inhalers - Targeted lung delivery systems	3
6	Non-Invasive Ventilation (NIV)	- Advanced NIV modes: AVAPS, iVAPS - High-flow NIV systems - Helmet NIV for acute respiratory failure	3

Sr. No.	Topic	Details	Hours
		- Long-term NIV in neuromuscular diseases	
7	Airway Clearance Techniques	- High-frequency chest wall oscillation devices - Intrapulmonary percussive ventilation - Mechanical insufflation-exsufflation - Oscillating PEP devices and acoustic percussion	3
8	Respiratory Care in Sleep Medicine	- Advanced PAP modalities: ASV, AVAPS - Implantable neurostimulation for sleep apnea - Novel oral appliances and position therapy devices - Telemedicine in sleep diagnostics and therapy	3
9	Pulmonary Rehabilitation	- Telerehabilitation programs and mobile health applications - High-intensity interval training in COPD - Neuromuscular electrical stimulation techniques - Cognitive behavioral therapy in pulmonary rehabilitation	3
10	Airway handling in emergencies	ACLS / BLS	
11	Artificial Intelligence in Respiratory Care	- Machine learning for ventilator waveform analysis - Predictive models for extubation readiness - AI-assisted interpretation of chest imaging - Clinical decision support systems in respiratory care	3
12	Intervention in Respiratory Medicine	-Anatomy of Bronchoscope/ Thoracoscope and maintenance of scope -Introduction to Adrences in Bronchoscopy and Thoracoscopy -Brochoscopy in ICU setting	3

Total Hours: 36