

PH.D. PRE-COURSE WORK EXAMINATION SYLLABUS

Paper II: Recent Advances in Operation Theatre & Anesthesia Technology

Sr. No.	Topic	Details	Hours
1	Advanced Anesthesia Delivery Systems	<ul style="list-style-type: none"> - Closed-loop anesthesia delivery systems - Target-controlled infusion (TCI) systems - Advances in inhalational anesthetic agents and vaporizers - Computer-assisted personalized sedation (CAPS) 	3
2	Monitoring Technologies in Anesthesia	<ul style="list-style-type: none"> - Depth of anesthesia monitoring: BIS, Entropy, Narcotrend - Advanced hemodynamic monitoring: Pulse contour analysis, TEE - Neuromuscular monitoring: Quantitative vs. qualitative methods - Cerebral oximetry and tissue perfusion monitoring 	3
3	Regional Anesthesia Techniques	<ul style="list-style-type: none"> - Ultrasound-guided regional anesthesia - Novel local anesthetics and adjuvants - Continuous catheter techniques and pumps - Fascial plane blocks: PECS, ESP, QLB 	3
4	Minimally Invasive Surgical Technologies	<ul style="list-style-type: none"> - Robotic-assisted surgery: da Vinci system, haptic feedback - Single-incision laparoscopic surgery (SILS) - Natural orifice transluminal endoscopic surgery (NOTES) - 3D laparoscopy and augmented reality in surgery 	3
5	Perioperative Pain Management	<ul style="list-style-type: none"> - Multimodal analgesia techniques - Novel opioid and non-opioid analgesics - Patient-controlled analgesia (PCA) systems - Chronic post-surgical pain prevention strategies 	3
6	Airway Management Advancements	<ul style="list-style-type: none"> - Video laryngoscopy and optical stylets - Supraglottic airway devices: 2nd and 3rd generation - Front-of-neck airway techniques and equipment - High-flow nasal oxygen in perioperative care 	3
7	Patient Safety and Quality Improvement	<ul style="list-style-type: none"> - Surgical safety checklists and team communication tools 	3

Sr. No.	Topic	Details	Hours
		<ul style="list-style-type: none"> - Simulation-based training in anesthesia and surgery - Electronic health records and decision support systems - Error reporting systems and root cause analysis 	
8	Advances in Transplant Anesthesia	<ul style="list-style-type: none"> - Organ preservation technologies - Anesthesia for ex vivo lung perfusion - Management of donors after circulatory death (DCD) - Immunosuppression and anesthetic interactions 	3
9	Perioperative Point-of-Care Testing	<ul style="list-style-type: none"> - Thromboelastography (TEG) and rotational thromboelastometry (ROTEM) - Point-of-care ultrasound (POCUS) in anesthesia - Rapid microbiology techniques in the OR - Blood gas and electrolyte analysis devices 	3
10	Green Anesthesia and Sustainability	<ul style="list-style-type: none"> - Low-flow and minimal-flow anesthesia techniques - Alternatives to halogenated inhalational agents - Waste anesthetic gas scavenging systems - Reusable vs. disposable equipment considerations 	3
11	Enhanced Recovery After Surgery (ERAS)	<ul style="list-style-type: none"> - Multimodal ERAS protocols for various surgeries - Prehabilitation and nutritional optimization - Goal-directed fluid therapy - Early mobilization and rehabilitation strategies 	3
12	Artificial Intelligence in Perioperative Care	<ul style="list-style-type: none"> - Predictive analytics for perioperative risk assessment - AI-assisted clinical decision support systems - Machine learning in anesthesia drug dosing - Automated documentation and workflow optimization 	3

Total Hours: 36