Essentials of
Anesthesiology, Critical Care and Resuscitation
for Medical Students

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As per the Competency-based Medical Education Curriculum (NMC)

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"I cannot teach anybody anything. I can only make them think."

—Socrates

Dedicated to...

I express my deep gratitude and dedicate this book to my parents, who made me capable and molded me to achieve heights. I also dedicate this book to my family for supporting me in all my academic ventures. I also dedicate it to my students for showing me how to teach better. Last but not least, I dedicate this to the almighty omnipresent, omnipotent, and omniscient Paramatma and Amma, the revered selfless, and compassionate saint who showered her grace on me.

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Preface

The sciences of Anesthesiology has made tremendous progress in the last century. The specialty matured from being an allied subject to achieving the status of a significant primary specialty. For the last few decades, working knowledge of Anesthesiology has been considered essential for any practicing doctor. Specialization in Anesthesiology is a favored choice with the growth in importance of the subject.

When the Medical Council of India revised the Undergraduate Training of Medical Graduates Curriculum in 2018–19, the syllabus committee decided to enhance the time allocated to Anesthesiology teaching significantly. The earlier teaching program devoted just a few lectures and a short posting to the specialty. The new curriculum ('Competency-based Undergraduate Curriculum for the Indian Medical Graduate' of the Medical Council of India - Vol III) allocates 40 lectures/demonstrations to subjects in the domain of Anesthesiology, Critical Care, and Resuscitation. The syllabus also mandates multiple technical competency-based assessments and Objective Structured Clinical Examination (OSCE) based assessments in these domains.

With a change in the medical education administration from the Medical Council of India (MCI) to the National Medical Council (NMC), significant medical education reforms are in process. A standard Medical Graduates Exit Examination is now mandatory per the NMC Act. All universities are required to follow a common prescribed syllabus and teaching pattern.

Most available Anesthesiology books focus on postgraduate training. With no concise book available, medical graduates struggle to acquire anesthesiology knowledge and depend on MCQs primarily taught in coaching centers. This book is written to cater to the requirements of undergraduate medical students. The book covers all topics prescribed in the new syllabus and also covers Resuscitation, an essential skill for all medical personnel.

The chapters are written by experienced authors who are all established and accomplished teachers. I am highly indebted to them for sparing their valuable time to promote this effort selflessly. I could plunge into this project due to their kind acceptance to advance knowledge in the fields dear to them.

The language of the book is simple yet technical. The knowledge in the book is limited to matters relevant to undergraduates. An attempt has been made to explain the subject in precise and easy-to-understand language. The book also covers all the knowledge needed to answer OSCE on different topics successfully.

Emergency medicine has been given the status of an independent subject. No standard textbook covers most aspects of managing patients in the emergency room. A significant part of this book will also benefit students of emergency medicine. This book will also benefit students trained outside the country. It will help provide the requisite knowledge to clear the Foreign Medical Graduates Examination.

I am very grateful to the whole team of M/s Jaypee Brothers Medical Publishers (P) Ltd, New Delhi, India, who helped and guided me, Shri Jitendar P Vij (Group Chairman), Mr Ankit Vij (Managing Director), Mr MS Mani (Group President), Dr Madhu Choudhary (Director–Educational Publishing), Ms Pooja Bhandari (Production Head), Ms Sunita Katla (Executive

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Mukul Chandra Kapoor

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Competency Table

Number	*COMPETENCY* *The student should be able to*	*Core (Y/N)*	*Suggested Teaching Learning method*	*Suggested Assessment method*	*Chapter*	*Page number*
AS1.1	Describe the evolution of anesthesiology as a modern specialty	N	Lecture	Written/ Viva voce	1	1
AS1.2	Describe the roles of Anesthesiologist in the medical profession (including as a peri-operative physician, in the intensive care and high dependency units, in the management of acute and chronic pain, including labor analgesia, in the resuscitation of acutely ill)	K	Lecture	Written/ Viva voce	1, 23	3, 192, 237
AS1.3	Enumerate and describe the principle of ethics as it relates to anesthesiology	K	Lecture	Written/ Viva voce	24	241
AS1.4	Describe the prospects of anesthesiology as a career	K	Lecture	Written/ Viva voce	23	236
AS2.1	Enumerate the indications, describe the steps and demonstrate in a simulated environment, Basic Life Support in adults, children and neonates	K/S	DOAP session	Skill assessment	21	206
AS2.2	Enumerate the indications, describe the steps and demonstrate in a simulated environment, Advanced Life Support in adults and children	S	DOAP session	Skill assessment	21	210
AS3.1	Describe the principles of preoperative evaluation	K	Lecture, Small group discussion	Written/ Viva voce	2	10
AS3.2	Elicit, present and document an appropriate history including medication history in a patient undergoing surgery as it pertains to a preoperative anesthetic evaluation	S	DOAP session, Bedside clinic	Skill station	2	10

Number	*COMPETENCY The student should be able to*	*Core (Y/N)*	*Suggested Teaching Learning method*	*Suggested Assessment method*	*Chapter*	*Page number*
AS3.3	Demonstrate and document an appropriate clinical examination in a patient undergoing general surgery	S	DOAP session, Bedside clinic	Skill station	2	14
AS3.4	Choose and interpret appropriate testing for patients undergoing surgery	S	DOAP session, Bedside clinic	Skill station	2	14
AS3.5	Determine the readiness for general surgery in a patient based on the preoperative evaluation	S	DOAP session, Bedside clinic	Skill station	2	14
AS3.6	Choose and write a prescription for appropriate premedications for patients undergoing surgery	S	DOAP session, Bedside clinic	Skill station	2	19
AS4.1	Describe and discuss the pharmacology of drugs used in induction and maintenance of general anesthesia (including intravenous and inhalation induction agents, opiate and non-opiate analgesics, depolarizing and non depolarizing muscle relaxants, anticholinesterases)	K	Lecture, Small group discussion	Written/ Viva voce	5	44
AS4.2	Describe the anatomy of the airway and its implications for general anesthesia	K	Lecture, Small group discussion	Written/ Viva voce	3	22
AS4.3	Observe and describe the principles and the practical aspects of induction and maintenance of anesthesia	S	Lecture, Small group discussion, DOAP session	Written/ Viva voce	4	38
AS4.4	Observe and describe the principles and the steps/techniques in maintenance of vital organ functions in patients undergoing surgical procedures	S	Lecture, Small group discussion, DOAP session	Written/ Viva voce	10	108
AS4.5	Observe and describe the principles and the steps/techniques in monitoring patients during anesthesia	S	Lecture, Small group discussion, DOAP session	Written/ Viva voce	9	92

Number	*COMPETENCY The student should be able to*	*Core (Y/N)*	*Suggested Teaching Learning method*	*Suggested Assessment method*	*Chapter*	*Page number*
AS4.6	Observe and describe the principles and the steps/techniques involved in day care anesthesia	S	Lecture, Small group discussion, DOAP session	Written/ Viva voce	15	151
AS4.7	Observe and describe the principles and the steps/techniques involved in anesthesia outside the operating room	S	Lecture, Small group discussion, DOAP session	Written/ Viva voce	15	157
AS5.1	Enumerate the indications for and describe the principles of regional anesthesia (including spinal, epidural and combined)	K	Lecture, Small group discussion	Written/ Viva voce	7	70
AS5.2	Describe the correlative anatomy of the brachial plexus, subarachnoid and epidural spaces	K	Lecture, Small group discussion	Written/ Viva voce	7,8	67,84
AS5.3	Describe the principles and steps/ techniques involved in peripheral nerve blocks	S	Lecture, Small group discussion, DOAP session	Written/ Viva voce	8	80
AS5.4	Describe the pharmacology of commonly used drugs and adjuvant agents in regional anesthesia	S	Lecture, Small group discussion, DOAP session	Written/ Viva voce	8	79
AS5.5	Observe and describe the principles and steps/techniques involved in caudal epidural in adults and children	S	Lecture, Small group discussion, DOAP session	Written/ Viva voce	7	73
AS5.6	Observe and describe the principles and steps/techniques involved in common blocks used in surgery (including brachial plexus blocks)	S	Lecture, Small group discussion, DOAP session	Written/ Viva voce	8	84
AS6.1	Describe the principles of monitoring and resuscitation in the recovery room	S	Lecture, Small group discussion, DOAP session	Written/ Viva voce	12	123

Number	*COMPETENCY The student should be able to*	*Core (Y/N)*	*Suggested Teaching Learning method*	*Suggested Assessment method*	*Chapter*	*Page number*
AS6.2	Observe and enumerate the contents of the crash cart and describe the equipment used in the recovery room	S	Lecture, Small group discussion, DOAP session	Written/ Viva voce	12	126
AS6.3	Describe the common complications encountered by patients in the recovery room, their recognition and principles of management	K	Lecture, Small group discussion, DOAP session	Written/ Viva voce	12	126
AS7.1	Visit, enumerate and describe the functions of an intensive care unit	S	Lecture, Small group discussion, DOAP session	Written/ Viva voce	13	129
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AS7.3	Observe and describe the management of an unconscious patient	S	Lecture, Small group discussion, DOAP session	Written/ Viva voce	13	130
AS7.4	Observe and describe the basic setup process of a ventilator	S	Lecture, Small group discussion, DOAP session	Written/ Viva voce	13	131
AS7.5	Observe and describe the principles of monitoring in an ICU	S	Lecture, Small group discussion, DOAP session	Written/ Viva voce	13	135
AS8.1	Describe the anatomical correlates and physiologic principles of pain	K	Lecture, Small group discussion, DOAP session	Written/ Viva voce	19	186
AS8.2	Elicit and determine the level, quality and quantity of pain and its tolerance in patient or surrogate	S	Lecture, Small group discussion, DOAP session	Written/ Viva voce	19	191

Number	*COMPETENCY The student should be able to*	*Core (Y/N)*	*Suggested Teaching Learning method*	*Suggested Assessment method*	*Chapter*	*Page number*
AS8.3	Describe the pharmacology and use of drugs in the management of pain	K	Lecture, Small group discussion, DOAP session	Written/ Viva voce	19	193
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AS9.1	Establish intravenous access in a simulated environment	S	Small group discussion, DOAP session	Skill assessment	17	166
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AS10.1	Enumerate the hazards of incorrect patient positioning	K	Lecture, Small group discussion, DOAP session	Written/ Viva voce	20	198
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Number	*COMPETENCY* *The student should be able to*	*Core (Y/N)*	*Suggested Teaching Learning method*	*Suggested Assessment method*	*Chapter*	*Page number*
AS10.3	Describe the role of communication in patient safety	K	Lecture, Small group discussion, DOAP session	Written/ Viva voce	20	198
AS10.4	Define and describe common medical and medication errors in anesthesia	K	Lecture, Small group discussion, DOAP session	Written/ Viva voce	20	199