

**FACULTY OF MEDICINE**

توصيف مقرر الدكتوراه

## COURSE SPECIFICATION DOCTORATE DEGREE (MD) IN ANESTHESIA, INTENSIVE CARE AND PAIN MANAGEMENT

**2020 - 2021**

## Program Admission

The doctorate (MD) program is designed to provide higher and advanced levels of specialty training. The applicant for the MD program is required to hold a Master of Medicine (as evidence of completion of the intermediate-level training) in the intended specialty with a minimum grade of "good" from Al-Azhar University or a university of the Arab Republic of Egypt or an equivalent degree from another scientific institute recognized by the university. The applicant must be practicing this specialty at the time of applying for the MD program registration. The board of departments may determine any other controls that they deem a condition of the restriction to be submitted to the College Council for consideration.

## Regulations for progression and program completion

The applicant is required to:

* Attend the courses and training requirements provided by the Department Council and approved by the College Council
* Complete innovative research on the subject approved by the University Council after approval by the College Council for at least two years from the date of enrollment. The results of his research should be presented to and accepted by the Judging Committee after a public discussion \*
* Successfully pass the prescribed tests

\* The research must be submitted to the department after approval of the supervisor or supervisory committee at least two months before the exam date, the applicant is allowed to register for the exam after the College Council confirmation of the judging committee's decision to accept the research.

## Academic standards of the doctorate (MD) program

Generic Academic Reference Standards (ARS) provided by the National Authority for Quality Assurance and Accreditation of education (NQAAC) for postgraduate programs was recently adopted. This was approved by the Faculty Council No 594 on 21 June 2011. These ARS include:

1. **Knowledge & understanding:** Graduate must have sufficient knowledge and understanding of:
	1. A1. Basic facts theories of anesthesia and related subject fields such as Intensive Care Unit (ICU) and pain medicine
	2. A2. Mutual relation between professional practice and effect on the environment
	3. A3. Recent advances in the field of anesthesia and intensive care
	4. A4. Define the recent management of trauma patients under anesthesia and recent knowledge of CPR
	5. A5. Recent patient monitoring during anesthesia and in the surgical ICU
	6. A6. Details of ethical and legal practice
	7. A7. Quality standards of the practice
	8. A8. Design conduction & publishing of scientific research
	9. A9. Ethical considerations in different types of scientific research

### Intellectual skills:

* 1. B1. Interpret and analyze the information of the anesthetic practice and make measurement and deduction upon them
	2. B2. Solve the problems that do not conform to classic data based on the available data
	3. B3. Carrying out research studies add to the knowledge of anesthesia
	4. B4. Conduct scientific research or write scientific papers in anesthesia and related subjects
	5. B5. Evaluate risks imposed during professional practices
	6. B6. Take professional decisions in a wide range of professional situations

### Professional & practical skills:

* 1. C1. Competent in all basic and all required advanced professional skills
	2. C2. Write and appraise reports
	3. C3. Evaluate methods and tools used in anesthesia and intensive care
	4. C4. Use technology to advance practice
	5. C5. Train junior staff through continuous medical education programs.
	6. C6. Apply the principles of sterile techniques and infection control guidelines
	7. C7. Plan professional development courses to improve practice of the staff
	8. C8. Write scientific papers

### General & transferable skills:

* 1. D1. Communicate effectively using all methods
	2. D2. Use information technology to improve his/her professional practice
	3. D3. Teach others and evaluate their performance
	4. D4. Perform self-appraisal and seek continuous learning
	5. D5. Use different sources of information to obtain data
	6. D6. Manage scientific meetings and appropriately utilize extrapolate & evaluation of information

# Course Specification of Anesthesia, Intensive Care and Pain Management MD program

# 2020 - 2021

**University:** Al Azhar

**Faculty:** Medicine

**Department:** Anesthesia, Intensive Care and Pain Management

### Data of the course:

|  |  |  |
| --- | --- | --- |
| Code of the course:**700-ANS-MD** | Title of the course**: Anesthesia, Intensive Care and Pain Management** | Year: **2020 - 2021**Level**:** MD degree |
| Specialty: **Anesthesia, Intensive Care and Pain Management** | Number of teaching units: **3 units** | Lectures: **864 hours**Practical/Clinical:**1920 hours** |

1. **Objectives of the course:**

The aim of this course is to provide the postgraduate with the higher and advanced knowledge and skills essential for the mastery of practice of the specialty and necessary for further training and practice in the field of Anesthesiology and Intensive Care through providing:

* + Recent scientific knowledge essential for the mastery of practice of anesthesia and intensive care according to the international standards.
	+ Skills necessary for proper diagnosis and management of patients in the field of anesthesiology and intensive care including diagnostic, problem solving, decision making and operative skills.
	+ Avoid, suspect, anticipate and manage different complications that may occur perioperatively.
	+ Resuscitate and manage critically patients safely and effectively.
	+ Manage peri-operative pain safely and efficiently, and to avoid and manage possible adverse effects of pain and drugs used for its relief.
	+ The graduate should receive training in complex technology of physics, equipment relevant clinical measurement associated with anesthesia & intensive care.
	+ Learn and teach other anesthesia trainees the principle of delivering safe and smooth anesthesia for common operations.
	+ To enable candidates to perform high standard scientific research and how to proceed with publication in indexed journals.
	+ Ethical principles related to the practice of this highly sensitive specialty.
	+ To enable candidates to describe the basic ethical and medico-legal principles relevant to anesthesia and intensive care.

### Intended learning outcomes of the course (ILOs):

**A- Knowledge and understanding**: By the end of the program the candidate should be able to:

A1 Demonstrate the recent advances in preoperative patient evaluation & pre-anesthetic medications.

A2 Know different types of anesthesia with the advantages & disadvantages of every type and understand the mechanism of action of different anesthetics& co- adjuvant drugs.

A3 Know the complication of anesthesia, how to anticipate & how to avoid & manage.

A4 Define the recent patient monitoring during anesthesia and in surgical intensive care.

A5 Mention the recent advances in breathing system, airway management, mechanical ventilation and resuscitation system.

A6 Explain and define recent types, classification, mechanism of action, reversal pharmacodynamics and pharmacokinetics of anesthetic drugs.

A7 Define the recent management of the trauma patient under anesthesia and in surgical intensive care and recent knowledge of Cardiopulmonary Resuscitation (CPR).

A8 Mention the principles and fundamentals of ethics and legal aspects of professional practice in the field of anesthesia and intensive care.

A9 Explain basics, methodology, tools and ethics of scientific medical, clinical research.

**B- Intellectual Skills:** By the end of the course the candidate should be able to:

B1 Interpret data acquired through history taking, clinical & investigatory findings to formulate anesthesia plan and Proper selection of patient.

B2 Select from different diagnostic alternatives the ones that help to reach a final diagnosis for anesthesia and intensive care unit problems.

B3 Conduct research studies that add to knowledge.

B4 Assess risk in professional practices and plan to improve performance in the field of anesthesia and intensive care unit.

B5 Identify anesthesia and intensive care unit problems and find solutions. B6 Write and publish scientific articles and papers in journals.

**C- Professional Skills:** By the end of the course, the candidate should be able to: C1 Acquire the basic and modern professional skills in anesthesia and

Intensive Care Unit.

C2 Acquire the skills of careful preoperative assessment, consultation for, interpretation of clinical data and laboratory results & write medical reports.

C3 Demonstrate clinical and technical competence in surgical intensive care & pain management unit.

C4 Understand and improve all methods, tools and techniques used in anesthesia& intensive care.

C5 Apply the principle of sterile techniques and infection control guidelines. C6 Teach junior staff through continuous medical education programs.

C7 Teach and plan professional development courses to improve practice and performance of juniors.

C8 Write scientific papers.

**D- General Skills:** By the end of the course the candidate should be able to: D1 Communicate effectively with patients and their families.

D2 Communicate effectively with other healthcare providers & work coherently & successfully as a part of the team & team's leadership.

D3 Use different sources of information & knowledge to obtain data. D4 Teach others and evaluate their performance.

D5 Use information technology to improve her professional practice.

D6 Manage scientific discussion based on scientific evidence and proofs.

### Course Content:

|  |  |  |
| --- | --- | --- |
| **Topics** | **Lecture** | **Practical****/Clinical** |
| Introduction | 1 | -- |
| Preoperative assessment& preoperative preparation | 8 | 20 |
| Airway management | 10 | 50 |
| Respiratory physiology and respiratory functions during anesthesia | 10 | 40 |
| Inhalational anesthetics | 10 | 10 |
| Monitoring | 10 | 50 |
| IV anesthetics | 10 | 10 |
| Neuromuscular physiology & muscle relaxants | 10 | 40 |
| Local anesthetics | 15 | 15 |
| Autonomic nervous system drugs | 8 | 16 |
| Regional anesthesia and nerve blocks | 20 | 60 |
| Perioperative fluid management and transfusion therapy | 15 | 50 |
| Post anesthesia care | 10 | 20 |
| Anesthetic complication | 15 | 30 |
| Anesthetic implications of concurrent & uncommon disease | 15 | 20 |
| Outpatient anesthesia | 8 | 30 |
| Anesthesia at remote location | 10 | 25 |
| Renal physiology & anesthesia for renal and genitourinary system | 15 | 30 |
| Anesthesia for liver and GIT | 12 | 30 |
| Anesthesia for ENT | 12 | 20 |
| Anesthesia for orthopedic and spine surgery | 15 | 30 |
| Anesthesia for ophthalmic surgery | 15 | 30 |
| Anesthesia for trauma and emergency conditions | 30 | 60 |
| Anesthesia for obstetrics and gynecology | 14 | 20 |
| Anesthesia for endocrine diseases | 20 | 40 |
| Anesthesia for elderly | 20 | 40 |
| Acid base balance & electrolyte balance | 20 | 40 |
| Cardiovascular physiology & anesthesia for cardiothoracic surgery | 40 | 200 |
| Defibrillator & DC shock | 3 | 10 |
| Cardiac pacing | 3 | 10 |
| Aortic balloon pump | 3 | 6 |

|  |  |  |
| --- | --- | --- |
| Echocardiography | 3 | 10 |
| Anesthesia for thoracic surgery & vascular surgery | 25 | 60 |
| Cerebral physiology & anesthesia for neurosurgery | 30 | 60 |
| Pediatric and neonatal anesthesia | 30 | 60 |
| Anesthesia for laparoscopic & Endoscopic operations | 30 | 40 |
| Anesthesia for obese & bariatric operations | 25 | 50 |
| Anesthesia for organ transplant | 30 | 50 |
| Anesthesia for oro-dental operations | 20 | 20 |
| Anesthesia for maxillofacial surgery | 20 | 40 |
| Anesthesia for reconstructive & plastic surgery | 25 | 30 |
| **Pain management** |
| Assessment of pain | 12 | 20 |
| Multidimensional nature of pain | 8 | 20 |
| Basic sciences related to pain | 12 | 30 |
| Ethical issues related to pain management | 8 | 20 |
| Psychology of pain and chronic pain behavior | 8 | 20 |
| Acute (postoperative) pain | 8 | 20 |
| Management of chronic pain | 12 | 30 |
| Pain in pediatrics & elderly | 12 | 20 |
| Cancer related pain | 20 | 20 |
| Interventional pain therapy | 12 | 30 |
| Neuromodulation techniques | 20 | 30 |
| Radiofrequency application in pain management | 12 | 20 |
| Image guided interventions | 20 | 20 |
| **Intensive care** |
| Mechanical ventilation | 15 | 60 |
| Post-operative intensive care | 10 | 23 |
| Parental nutrition | 25 | 50 |
| Management of burn patient | 12 | 20 |
| Poisoning | 10 | 25 |
| General intensive care | 10 | 30 |
| Quality assurance in anesthetic patient | 8 | -- |
| Ethical and legal aspect | 10 | -- |
| CPR | 15 | 30 |
| Ultrasound applications in Anesthesia and ICU | 20 | 60 |
| Computer in relation to anesthesia | 10 | -- |
| Medical statistics | 10 | -- |
| **TOTAL** | **874** | **2070** |



1. **Methods of training:**
	* Practical and clinical settings
	* Lectures and tutorials
	* Workshops and simulation
	* Case study
	* Seminars & group discussion

### Mandatory courses and tests:

* + Advanced airway management course
	+ Ultrasound guided nerve block and vascular access course
	+ Scientific statistics course
	+ English proficiency test

### Trainees evaluation and assessment:

1. **In-training assessment**
	1. Observation of clinical practice
	2. Progress in achieving the required competencies (see index)
	3. Logbook review
	4. Module Director Report at the end of each rotation
	5. Completion of Rotation Report at the end of each rotation
	6. Annual Evaluation Report

### Eligibility for applying to the MD exam

* 1. Completion and acceptance of the MD thesis by the Al-Azhar University Council
	2. Completion of the minimum rotational period in all modules of the curriculum (see index)
	3. Achieving the required competencies for the higher-level training as a minimum
	4. Satisfactory logbook
	5. Completion of the mandatory courses and workshops

### Final MD exam

* 1. Written exam: To assess knowledge and intellectual skills
		1. First paper: A 3-hour written test in anesthesia, one hour is dedicated for Multiple Choice Questions (MCQ)
		2. Second paper: A 3-hour written test in anesthesia
		3. Case study (commentary): A 90-minute written test for a case discussion, the trainee is required to explain, diagnose and describe management of the condition in details
		4. Basic science: A 3-hour written test in pharmacology, physics and clinical measurements related to anesthesia
	2. Oral Exam: To assess practice, decisions and intellectual skills 1- Oral exam in anesthesia, intensive care and pain medicine: 6

sessions of a structured oral examination, a minimum of 3 professors in each session, a minimum of one external examiner is mandatory in all sessions

2- Oral exam in pharmacological, physics and clinical measurements related to anesthesia: 6 sessions with a minimum of 3 professors in each session, a minimum of one external examiner is mandatory in all sessions

* 1. Objective Structured Clinical Examination (OSCE): To assess performance and clinical skills: accompanying the oral exam sessions

### Teaching books, notebooks, and references: Required books (textbooks):

* + Basics of Anesthesia: by Stoelting RK and Miller RD, 5th edition, Churchill Livingstone.
	+ Morgan G.E, Mikhail M and Murry M., (2008): Clinical anesthesiology, 5th edition, McGraw Hill Companies, UK, and USA.
	+ Paul L Marino: The ICU Book (3rd Edi on, 2007).
	+ Dawn A. Marcus: Chronic pain: a primary care guide to practical management (2nd edition, 2009).
	+ Guyton AC, Hall JE: Textbook of Medical Physiology, 11th ed. Saunders, 2006.
	+ Alex S Evers: Anesthetic Pharmacology 1st edition 2003.
	+ Basic physics & measurement in anesthesia; Davis P.D., Parbrook G. D. and Kenny C.N., 4th edition, Butterworth-Heinemann, 1995.

### Recommended books

* + David E. Longenecker: Anesthesiology, (1st edition, 2007).
	+ Alan R Aitkenhead: Textbook of anesthesia (5th edition, 2007).
	+ Miller R.D., Cucchiara RF et al, (2000): Anesthesia, 5th edition.
	+ Mechanical Ventilation - Maclntyre N R Branson R D 2008.
	+ Textbook of critical care (Shoemaker, 5th edition, 2005).
	+ Intensive care medicine (Irwin and Rippe) 6th edition, 2008).
	+ Frederic S. Bongard: Current Diagnosis & Treatment in critical care (3rd edition, 2008).
	+ JP Howard Fee: Physiology for Anesthesiologists (2nd edition 2005).
	+ Godman Gilmans. The pharmacological therapeutics. 11th Ed, 2006.

### Periodicals Web Sites:

* + British Journal of Anesthesia.
	+ ASA Refresher Course Lectures.
	+ Anesthesiology.
	+ Anesthesia Analgesia.
	+ Egyptian journal of anesthesia.
	+ JAMA.
	+ Lancet.
	+ [www.anesthesiauk.com](http://www.anesthesiauk.com/)
	+ [www.pharmacology2000.com](http://www.pharmacology2000.com/)
	+ [www.freshgasflow.com.](http://www.freshgasflow.com/)

# Course Specification of Pharmacology in Anesthesia, Intensive Care and Pain Management MD program

#  2020/2021

**University:** Al Azhar

**Faculty:** Medicine

**Department:** Anesthesia & Intensive Care.

### Data of the course:

|  |  |  |
| --- | --- | --- |
| Code of the course:**ATC.1002** | Title of the course**: Pharmacology** | Year: **2020/2021** Level**:** MD degree |
| Specialty: **Anesthesia, Intensive Care and Pain Management** | Number of teaching units: **single** | Lectures: **96 hours**Practical/ Clinical **hours** |

1. **Course Aim:**

By the end of the course the candidate will be able to:

* + Provide the candidate with an in depth understanding of the pharmacology of drugs frequently used by anesthesiologists, including mechanisms of action, adverse effects, dosing, drug interactions, and use in specific patient populations
	+ Knowledge and understanding the principles and practice of pharmacology
	+ Describe the principles that govern taking decision for the suitable types of drugs for patient

### Intended Learning Outcomes (ILOs): A- Knowledge and understanding:

By the end of the course the candidate will be able to:

* 1. A1. Identify the pharmacokinetic principles affecting drug actions
	2. A2. Discuss the pharmacodynamics principals regulating drug action
	3. A3. Describe the pharmacotherapies of cardiac dysrhythmias, hypertension, heart failure, ischemic heart disease and dyslipidemias
	4. A4. Describe the pharmacotherapies of shock, diabetes mellitus, bronchial Asthma, epilepsy, coagulopathy and sepsis
	5. A5. Recognize the pharmacotherapies in endocrinal emergencies

### B- Intellectual skills:

By the end of the course the candidate will be able to:

* 1. B1. Correlate between the medical condition of the patient and the drug that will be used for treatment
	2. B2. Evaluate the appropriate dosing of drugs according to the different characteristics of patient
	3. B3. Evaluate the different pharmacotherapies of acid-base balance disorders
	4. B4. Evaluate the different agents used in general and local anesthesia
	5. B5. Assess the different drug adverse reaction and toxicities
	6. B6. Compare the efficacy and effectiveness of the different analgesic drugs

### C- Professional skills:

By the end of the course the candidate will be able to:

* 1. C1. Appraise the different clinical pharmacology principles that should be applied to define the appropriate medicine
	2. C2. Report the different drug adverse the reaction and toxicities
	3. C3. Avoid or manage drug interactions and adverse effects during anesthesia

### D- General skills

By the end of the course the candidate will be able to:

* 1. D1. Communicate effectively with other health care professionals to maximize patient benefits and minimize the risk of errors
	2. D2. Transfer the knowledge and skills of selecting and using the different agents used in general and local anesthesia
	3. D3. Transfer the knowledge and skills of selecting and using the different Uses of skeletal muscle relaxants
	4. D4. Handle data appropriately and analyze them through decision processes, objective criteria, problem definition and evaluation

### Course content:

|  |  |
| --- | --- |
| **Topics** | **No of hours** |
| **Lecture** | **Practical** |
| Introduction Pharmacokinetics & pharmacodynamics | 2 |  |
| Autonomic nervous system | 5 |  |
| IV induction anesthesia inhalational anesthetics | 5 |  |
| Neuromuscular blocking drugs | 4 |  |
| Anticholinesterases | 2 |  |
| Local anesthetics | 4 |  |
| Drug dosage in the ICU | 4 |  |
| Common drug toxicities and management | 3 |  |
| Basic principle of clinical pharmacology | 2 |  |
| Electrolytes and acid base balance | 6 |  |
| Endocrinal emergencies | 4 |  |
| Drug therapy of heart failure | 5 |  |
| Drug therapy of ischemic heart diseases | 5 |  |
| Drug therapy of dysrhythmias | 5 |  |
| Drug therapy of hypertension | 5 |  |
| CNS pharmacology:* Sedative & Hypnotics
* Anxiolytics
* Narcotic analgesics
* Non-narcotic analgesics
* anticonvulsants
* anti-parkinsonism
* antipsychotics
* CNS stimulant
 | 10 |  |
| Diuretics | 2 |  |
| Drug therapy of shock | 3 |  |
| Drug therapy of diabetes mellitus | 2 |  |
| Drug therapy of bronchial asthma | 2 |  |
| Drug therapy of endocrine diseases | 2 |  |
| Antiemetic drugs | 1 |  |
| Proton pump inhibitors | 1 |  |
| Drug interaction | 6 |  |
| Drugs used in ICU | 6 |  |
| **TOTAL** | **96** |  |

1. **Teaching and learning Methods:**
	* Lectures

### Student Assessment a- Procedures used:

* + Written exam to assess knowledge and intellectual skills.
	+ Oral exam to assess knowledge, decisions and intellectual skills.

### Schedule:

* + Written exam to assess knowledge and intellectual skills.
	+ Oral exam to assess knowledge and intellectual skills**.**

### List of textbooks and References: a- Course Notes:

* + Lecture Notes by professors of Pharmacology department.

### Required Books:

* + Goodman and Gilman's Manual of Pharmacology and Therapeutics. Ed. Laurence L. Brunton; Keith L. Parker; irrac Gravy- Hill, 2008.
	+ Basic and Clinical Pharmacology 10th Edition. Ed:Bertram G. Katzung; Appleton & Lange , 2007.
	+ Principles of Pharmacology. The pathophysiologic basis of drug therapy. Eds. Golan et al. 2nd edition. 2008. Lippincott.

### Periodicals

* + British J. of pharmacology
	+ American J. of pharmacology
	+ Lancet J.
	+ JAMA J.
	+ Web Sites: Pubmed: [http**://**wwwmcbLnimmih.gov/PubMed.](http://wwwmcbLnimmih.gov/PubMed) etc

# Course Specification of Physics and Measurement for Anesthesia, Intensive Care and Pain Management MD degree

**2020/2021**

**University:** Al Azhar

**Faculty:** Medicine

**Department:** Anesthesia, Intensive care and Pain Management.

### Data of the course:

|  |  |  |
| --- | --- | --- |
| Code of the course:**ATC 1002** | Title of the course**: Physics and****Measurements** | Year: **2020/2021** Level**:** MD degree |
| Specialty: **Anesthesia, Intensive care and Pain Management.** | Number of teaching units: **single** | Lectures: **192hours**Practical/ Clinical: **384 hours** |

1. **Course Aim**

By the end of the course the candidate should be able to:

* + Demonstrate and understanding of the knowledge of physics applied in the field of anesthesia
	+ Describe the principles and uses of monitoring devices
	+ Understand the clinical measurement in anesthesia either direct or indirect

### Intended Learning Outcomes of Course (ILOs):

**A- Knowledge and Understanding:**

By the end of the course the candidate should be able to:

* 1. Describe definition of the heat; ambient, latent, clinical application, transfer of heat
	2. Demonstrate laws of gases; Boyle's, Charle's, Lussac, Dalton, Kelvin scale, equation of state of perfect gas
	3. Explain liquefaction of gases; critical temp, critical pressure, physical properties of gases, clinical application of gas cylinder
	4. Demonstrate solubility of gases in liquids; factor affecting solubility, solubility coefficient, blood/gas partition coefficient
	5. Define diffusion of gases; physical factors affecting diffusion, factors fleeting diffusion of gases across pulmonary membrane
	6. Illustrate and explain flow of fluid through uniform tube, through tubes of variable diameters and through orifice
	7. Identify properties of gases, liquid & vapor; density, specific gravity, viscosity, timidity, surface tension, osmotic pressure & clinical application
	8. Describe Vaporization & vaporizer; properties of vapor, vapor pressure curve, types of vaporizers, factors affecting design, calibrations, factors affecting performance
	9. Explain humidifier; types, advantages, mechanism, complications
	10. Mention mechanical ventilators; types, criteria, ventilation - perfusion disturbance
	11. Describe anesthetic breathing system and gas scavenging
	12. Illustrate pressure reducing valves; types, advantages, physical principles
	13. Mention and explain fires & explosion; prevention, source, ignitable anesthetics
	14. Demonstrate nuclear physics and ionizing radiation; atomic structure, radioactivity, measurement of radiation
	15. Mention and explain measuring system; sensor, processor, recorder, units of measurement
	16. Define derived mechanical units; measurement of pressure, temp, humidity, volume, blood loss, measurement of flow, blood flow, gas flow
	17. Illustrate analysis of gas mixture acid-base state; measurement of 02 tension, co2 tension, PH, acid-base evaluation
	18. Mention and explain monitoring of cardiovascular system; arterial blood pressure, ECG, central venous catheterization, pulmonary artery catheter, cardiac output
	19. Explain monitoring of respiratory system; pulse oximetry, capnography, anesthetic gas analysis
	20. Mention monitoring of CNS: electroencephalography, evoked potentials BIS
	21. Mention muscular monitoring; peripheral nerve stimulator
	22. Identify physical principals of laser electricity and ultrasound in relation to anesthesia practice

### B- Intellectual Skills:

By the end of the course, the candidate should be able to:

* 1. Correlate between the state of the anesthetized patient and the observed parameters
	2. Integrate the effect of calibrated equipment on the patient
	3. Identify the problem implied on the patient due non-calibrated equipment

### C- Professional Skills:

By the end of the course, the candidate should be able to:

* 1. Evaluate anesthetic equipment and how to check proper performance of anesthetic machine and different equipment
	2. Practice different techniques and methods for measurement of different vital data adequately in a proper time with minimal errors
	3. Define the appropriate equipment
	4. Deal with alarming of anesthetic machine and different apparatus

### D- General kills:

By the end of the course, the candidate should be able to:

* 1. Communicate with each other and interact effectively with patients using the propitiate anesthetic sets, then write a report about the result of calibrations, integrity of these sets and complications and discuss with staff members
	2. Present plan for test the anesthetic equipment in accordance with the standard scientific guidelines
	3. Manipulate computer programs, do web search, to write an essay about patient with certain problems due to anesthetic equipment and with trial of solving
	4. Work together to check anesthetic equipment integrity and discuss their point of view
1. **Course content:**

|  |  |
| --- | --- |
| **Topics** | **No. of Hours** |
| **Lectures** | **Practical** |
| SI units (basic – derived) | 5 | -- |
| Gas diffusion & solubility of gas and liquids Behavior of gases & Gas laws | 5 | 10 |
| Flow, Viscosity, Density, Surface tension, Osmosis | 5 | 10 |
| Pressure gauges & pressure regulators | 5 | 10 |
| Anesthetic breathing systems | 5 | 15 |
| Safety measures in anesthetic machine | 5 | 10 |
| Nuclear physics | 10 | 5 |
| Ultrasound | 10 | 10 |
| Electricity (principles, electronics, pacemaker, defibrillator, electrocution) | 10 | 10 |
| Heat & Temperature | 5 | 10 |
| Humidity & Nebulizers | 5 | 10 |
| Vaporizers | 8 | 10 |
| Ventilators | 15 | 15 |
| Respiratory functions | 8 | 15 |
| Pollution in OR & Scavenging systems | 5 | 10 |
| Fires & explosions | 5 | 10 |
| Measurement of arterial blood pressure | 3 | 10 |
| Physical principals of laser and uses | 10 | 20 |
| Measurement of CVP | 3 | 20 |
| Measurement of pulmonary artery pressure | 5 | 10 |
| Measurement of neuromuscular blockade | 3 | 15 |
| CNS monitoring | 10 | 20 |
| Monitoring of depth of anesthesia | 8 | 10 |
| Respiratory function monitoring | 10 | 15 |
| Measurement of humidity | 5 | 10 |
| Measurement of CO2, capnography | 2 | 10 |
| Measurement of O2, pulse oximeter | 2 | 10 |
| Measurement of cardiac output | 2 | 10 |
| Measurement of temperature | 2 | 10 |

|  |  |  |
| --- | --- | --- |
| Measurement of osmosis | 2 | 6 |
| Flow meters | 2 | 10 |
| Mass spectrometer | 2 | 8 |
| Analysis of gas mixture | 2 | 10 |
| Exponential curves | 8 | 10 |
| **TOTAL** | **192** | **384** |



### Teaching and learning method:

* + Lectures.
	+ Discussion sessions
	+ Practical
	+ Field study

### Student Assessment a- Procedures used:

* + Written exam
	+ Oral exam
	+ OSCE exam

### Schedule:

* + Written exam to assess knowledge and intellectual skills
	+ Oral exam to assess knowledge and intellectual skills
	+ OSCE exam: to assess performance and intellectual skills

### List of textbooks and References:

* **Course notes: -**

- Lectures

### Required textbooks:

* + Basic Physics and Measurement in Anesthesia. By Kenny, Gavin, Davis, Paui D. Published by Butterworth- ileinemann Publishers:.5th-edition, 2003.
	+ Fundamental Principles and Practice of Anesthesia By Peter Hutton, Griselda Cooper, Francis M James, John F. Butterworth

IV. Published by Informal Health Care, 2002.

* + Miller's Anesthesia By Ronald Miller. Published by Churchill Livingstone; 6th edition, 2004.
	+ Basic physics & measurement in anesthesia; Davis P.D., Parbrook

G. D. and Kenny C.N., 4th edition, Bu erworth Heirmann, 1995.

### Recommended books:

* + Understabding Anesthesia Equipment by Jerry A. Dorsch, Susan

E. Dorsch. Published by Lippincott Williams & Wilkins, 5th edition, 2007.

* + Physics Applied To Anesthesia By D.W. HILL, London. Published by Butterworth. 3rd ed, 1976.

### Periodicals, websites:

* + [www.anesthesiauk.com/default.aspx](http://www.anesthesiauk.com/default.aspx)
	+ [www.pharmacology2000.com/physics1Chemistry\_Physics/physi](http://www.pharmacology2000.com/physics1Chemistry_Physics/physi) cs'.htm [www.freshgasflow.com/index.html](http://www.freshgasflow.com/index.html)

**Course Coordinators**

**Dr. Abdelazem Abdelhalem Hegazy**

**Dr. Alaaeldin Mahmoud Saied Ahmed**

**Dr. Mostafa Mohammed Sabra Bakry**

**Head of the department**

**Prof. Dr/ Ayman Kahla**

# Index of competencies required for the Anesthesia, Intensive Care and Pain Management MD training program

**2020/2021**

## Mandatory Rotational Period

|  |  |
| --- | --- |
| **Module** | **Minimum rotational period (months)** |
| General and remote areas | 8 |
| Obstetrics and Gynecology | 3 |
| Paediatric | 3 |
| Orthopaedic | 3 |
| ENT | 2 |
| Ophthalmic | 2 |
| Neurosurgery | 3 |
| Cardiothoracic | 3 |
| Urosurgery | 2 |
| Plastic | 1 |
| Vascular | 2 |
| Dental and Maxillofacial | 1 |
| Pain | 1 |
| ICU | 6 |
| **Total** | **40** |

### General anesthetic competencies:

* Airway assessment, prediction and management of complex cases
* Proper utilization of advanced airway management techniques and tools
* Fiberoptic intubation (asleep and awake) in elective and emergency settings
* Proper understanding and ability to perform surgical airway techniques
* Management of pediatric difficult airway (elective and emergency)
* Decision making in difficult airway situations
* Perioperative management of high-risk patients undergoing general procedures (ASA III, IV)
* Proper understanding and application of patient risk stratification and scoring systems
* Safe and effective practice of risk-benefit balance in anesthetic decision making
* Proper understanding and utilization of risk stratification in predicting perioperative morbidity
* Proper preoperative optimization of high-risk patients with complex comorbidities
* Perioperative management of major and complex abdominal procedures (elective and emergency)
* Proper understanding of physiological changes and limitations of laparoscopic procedures
* Proper perioperative management of complex laparoscopic procedures
* Proper perioperative management of obese and morbid obese patients
* Proper management of massive bleeding (theater and ICU)
* Proper postoperative pain management for high-risk patients and procedures
* Management of day case surgery and proper patient selection
* Proper understanding of the day surgery limitations
* Proper understanding and practice of enhanced recovery after surgery
* Perioperative management of procedures out-of-theater and in remote areas

### Obstetrics & gynecology anesthetic competencies:

* Proper understanding and assessment of high-risk in obstetric settings (maternal – fetal)
* Proper airway management in obstetric emergencies
* Ability to provide safe analgesia for normal labour in complex situations (BMI>40, mental retardation)
* Ability to provide safe anesthesia and analgesia for caesarean section (elective and emergency)
* Ability to conduct safe anesthesia for high-risk patients undergoing obstetric procedures
* Proper management of peripartum haemorrhage
* Proper perioperative anesthetic management of pregnancy with associated heart diseases
* Proper understanding and management of pre-eclampsia and associated complications
* Proper perioperative management of pregnant patients undergoing non- obstetric procedures (elective and emergency)
* Perioperative management of major obstetric procedures
* Proper postoperative pain management of Caesarean Sections
* Maternal resuscitation and life support
* Competency in neonatal resuscitation
* Proper understanding and management of laparoscopic gynecological procedures
* Proper perioperative management of complex gynecological procedures
* Postoperative critical care management of complicated/high-risk obstetric patients
* Proper perioperative optimization of pregnant patients in the intensive care

### Pediatric anesthetic competencies:

* Demonstrates an understanding of physiological and anatomical changes in neonates and pediatrics
* Proper assessment and management of pediatric difficult airways
* Safe management of pediatric airway emergencies (e.g., laryngospasm, foreign body, croup)
* Proper adjustment of doses and sizes of anesthetic tools in pediatrics and neonates
* Provide safe anesthetic management for neonates and pediatrics for different procedures
* Proper understanding and anesthetic management of preterm neonates/infants undergoing surgical procedures
* Provide safe anesthetic management for emergency pediatric procedures
* Proper perioperative management of pediatric patients with congenital diseases undergoing non-cardiac procedures
* Provide safe adequate ventilation to pediatrics of different age groups
* Proper perioperative fluid management in pediatrics
* Proper perioperative anesthetic management in laparoscopic pediatric procedures
* Provide safe regional anesthesia in pediatrics
* Provide safe sedation for children of different age groups
* Provide safe sedation to pediatrics in remote areas (e.g., MRI/CT)
* Provide perioperative acute pain assessment and management for pediatrics
* Proper understanding and perioperative management of common syndromes (e.g., Down)
* Perioperative optimization of pediatric patients in the intensive care
* Competency in obtaining vascular access in pediatrics (peripheral, central, arterial and intraosseous)

### Orthopedics & trauma anesthetic competencies:

* Proof of the intermediate training competencies
* Airway management and algorithms for emergency induction and intubation in trauma
* Emergency airway management in trauma including surgical airway
* Demonstrates competency in trauma management (primary and secondary surveys)
* Competency in shock resuscitation, fluid therapy and damage control resuscitation
* Perioperative management of patients with multiple trauma
* Proper management of blood component therapy, trauma coagulopathy and massive musculoskeletal trauma
* Demonstrates competency in using ultrasound in trauma (FAST)
* Demonstrates competency in management of the following:
* Pediatric, Geriatric and Pregnant trauma
* Burn
* Blunt or penetrating injuries
* Traumatic brain injury
* Spinal cord trauma
* Ocular and maxillofacial trauma
* Chest trauma
* Abdominal trauma
* Perioperative management of high-risk orthopedic patients (elective and emergency)
* Perioperative management of complex orthopedic procedures (e.g., scoliosis, pelvic operations)
* Demonstrates competency in utilizing nerve locator in nerve blocks with or without ultrasound (upper and lower limbs)

### Regional Anesthesia anesthetic competencies:

* Proper understanding of indications and limitations of regional anesthesia in high-risk patients
* Demonstrates a proper selection of suitable regional technique to different procedures
* Demonstrates competency in utilizing ultrasound in regional anesthesia with or without nerve locator
* Demonstrates mastery (indications, performance, limitations and management of complications) in the essential blocks:
* Epidural anesthesia/analgesia in:
	+ Thoracic
	+ Lumbar
	+ Caudal
* Brachial plexus block by different approaches:
	+ Interscalene
	+ Supraclavicular
	+ Axillary
	+ Infraclavicular
* Lower limb blocks:
	+ Femoral
	+ Sciatic
	+ Obturator
	+ Lateral femoral cutaneous
	+ Ankle block
* Transversus Abdominis Plane (TAP) block
* Cervical plexus block, superficial and deep

### ENT anesthetic competencies:

* Proper airway management in head and neck procedures
* Perioperative management of complex ENT procedures (e.g., total laryngectomy)
* Perioperative management of pediatrics undergoing ENT procedures
* Perioperative management of high-risk patients undergoing head and neck procedures (ASA III, IV)
* Proper perioperative management of tracheostomies
* Perioperative management of emergency head and neck procedures (adult and pediatric)
* Postoperative and critical care management of patients following complex ENT procedures

### Ophthalmics anesthetic competencies:

* Proper airway management in ophthalmic procedures involving shared airway
* Proper perioperative anesthetic management of pediatrics undergoing ophthalmic procedures
* Perioperative management of emergency ophthalmic procedures (penetrating eye injury)
* Proper understanding of the principles and measures to control IOP
* Perioperative management of complex ophthalmic procedures
* Perioperative management of high-risk patients for ophthalmic procedures under local and general anesthetics
* Demonstrates competency in performing different local anesthetic techniques for ophthalmic procedures
* Demonstrates an understanding of limitations of the local anesthetic ophthalmic techniques
* Proper management of complications of local anesthetic ophthalmic techniques

### Neurosurgery anesthetic competencies:

* Competency in airway and perioperative management for patients with unstable cervical spine
* Perioperative management of complex spinal surgeries
* Demonstrates competency in performing proper neurological examination and assessment in complex neurosurgery patients
* Proper understanding of the principles and measures to control ICP in anesthetic and critical care settings
* Perioperative management of craniotomy (adult and pediatric)
* Demonstrates an understanding of changes and limitations in different neurosurgical positions
* Proper understanding and application of the brain protection strategies
* Perioperative management of emergency neurosurgery procedures
* Proper understanding and utilization of novel monitoring techniques during neurosurgical procedures
* Perioperative anesthetic and critical care management of hemorrhagic stroke
* Proper critical care management of ischemic stroke
* Demonstrates an understanding of the principles of critical care management of subarachnoid hemorrhage
* Perioperative management of interventional neuroradiological procedures (diagnostic and therapeutic)

### Cardiac & thoracic anesthetic competencies:

* Preoperative assessment and optimization of complicated cardiothoracic patients using different scoring systems
* Proper understanding of the cardiac bypass machine principles, uses and risks
* Proper understanding of myocardial protection strategies
* Perioperative management of cardiac valve replacement procedures
* Perioperative management of CABG procedures
* Perioperative management of cardiothoracic off-pump procedures
* Perioperative management of congenital heart disease procedures
* Perioperative management of complex aortic procedures
* Demonstrates competency in the utilization of vasoactive medications
* Perioperative management of emergency cardiac procedures
* Proper management of cardiac tamponade
* Proper understanding and utilization of cardiac monitoring (TEE, LIDCO, PICCO)
* Proper understanding and application of point-of-care coagulation testing and correlation with the usage of anticoagulants
* Postoperative management of patients following cardiac surgery (including fast-track recovery)
* Perioperative management of open thoracic procedures
* Proper patient evaluation, selection and prediction of morbidity in thoracic procedures
* Perioperative management of video-assisted thoracoscopic procedures
* Demonstrates competency in performing safe and effective one-lung ventilation
* Proper management of chest trauma
* Demonstrates competency in chest drains insertion and management

### Urology anesthetic competencies:

* Perioperative management of high-risk patients undergoing urology procedures (ASA III, IV)
* Perioperative management of major and complex urological procedures
* Perioperative management of pediatrics undergoing urological procedures
* Perioperative management of major reconstructive urological procedures
* Proper understanding and management of TURP syndrome and its consequences
* Demonstrates an understanding and proper management of common complications in urological procedures (e.g., pneumothorax in nephrectomy)
* Proper understanding of the renal transplant principles, indication and requirements (e.g., immunosuppressive medications)
* Proper perioperative optimization of patients with renal impairment
* Proper adjustment of medication dosing in renal impairment patients

### Plastic surgery anesthetic competencies:

* Competency in airway management for patients undergoing major reconstructive maxillo-facial procedures
* Competency in performing awake fiberoptic intubation for a patient with diagnosed maxillo-facial pathology
* Proper understanding and utilization of invasive monitoring during maxillofacial procedures
* Proper airway management in patients with burn (recent and old)
* Proper understanding of the physiological changes in burn
* Proper management and resuscitation of burn patients
* Proper perioperative management of patients with recent and old burns
* Proper perioperative management of bariatric procedures
* Competency in performing safe and effective regional anesthesia in morbid- obese patients (BMI>40)

### Vascular surgery anesthetic competencies:

* Demonstrates an understanding of the clinical predictors of increased perioperative morbidity and mortality
* Demonstrates competency in the assessment and optimization of patients for vascular procedures
* Perioperative management of major vascular procedures (carotid - aortic)
* Perioperative management of emergency vascular procedures
* Demonstrates competency in using regional anesthetic techniques to manage vascular procedures
* Demonstrates competency in utilizing the advanced cardiovascular monitoring techniques in vascular procedures
* Proper management of major vascular clamping/unclamping and reperfusion changes
* Perioperative management of radiologically guided vascular procedures
* Demonstrates proper perioperative planning and management in the following:
	+ Abdominal aortic reconstruction
	+ Clamp level: infrarenal, suprarenal, supra celiac
	+ Thoracoabdominal aortic aneurysm surgery, perioperative preparation and monitoring
	+ Spinal cord and renal protection
	+ Endovascular aortic repair EVAR and TEVAR
	+ Carotid endarterectomy

### Dental anesthetic competencies:

* Proper airway management in dental procedures involving shared airway
* Perioperative management of complex dental procedures
* Perioperative management of high-risk patients for dental procedures (ASA III, IV)
* Proper perioperative anesthetic management of pediatrics undergoing dental procedures

### Pain competencies:

* Obtain a complete pain history, perform a relevant examination and formulate a differential diagnosis and treatment plan
* Incorporates pharmacologic and non-pharmacologic modalities of treatment including chronic pain medication
* Demonstrates knowledge of basic legal, social, and bioethical issues encountered in chronic pain management, including informed consent for treatment with controlled drugs
* Demonstrates knowledge of interventional techniques commonly employed in chronic pain medicine including peripheral nerve blocks, sympathetic blockade for upper & lower extremity, trigger point injections, epidural steroid injections, blocks for diagnosis and treatment of the facet joint syndrome and sacroiliac joint injections
* Proper management of different chronic pain disorders including:
	+ Complex regional pain syndrome
	+ Neuropathic pain syndromes (i.e., peripheral diabetic neuropathy, post-herpetic neuralgia)
	+ Central pain syndromes
	+ Visceral and pelvic pain
	+ Headaches
	+ Pain related to peripheral vascular insufficiency
* Proper usage of ultrasound in diagnostic and therapeutic pain management procedures
* Proper understanding and description of sympathetic ganglion and plexus blocks (stellate ganglion block, lumbar sympathetic block and celiac plexus block)
* Demonstrates an understanding to the role of personality disorders, anxiety states, depression, compensation and disability in pain management
* Proper assessment and management of pain in pediatrics
* Proper assessment and management of acute post-surgical and non-surgical pain
* Proper understanding of the brain and spinal cord stimulation techniques (e.g., TENS)

### Intensive care competencies:

* Proper history taking and assessment of critically ill patients
* Proper utilization of the laboratory and radiological diagnostic tools
* Competency in performing and leading cardiopulmonary resuscitation (BLS, ALS, PALS and ATLS)
* Proper management of post-resuscitation care
* Proper understanding and application of the primary, secondary and tertiary surveys in trauma patients
* Proper management and resuscitation of burn patients
* Proper management of different types of shock
* Proper understanding and application of variable ventilatory modes and options in the ICU
* Competency in providing organ support in critically ill patients (CNS, CVS, Respiratory, Renal, Hepatic and Nutritional)
* Proper understanding and application of the different scoring systems in the ICU
* Proper usage and selection of antimicrobial therapy in the ICU
* Proper understanding and application of the infection control principles in the ICU
* Proper understanding of the nutritional requirements and methods of nutritional support (enteral and parenteral)
* Proper understanding and application of different modes of renal replacement therapy
* Proper understanding and application of sedation in the ICU
* Proper understanding and application of brain-stem death testing
* Proper understanding of the physiological support required for organ donation
* Demonstrates competency in preoperative optimization and postoperative care of high-risk patients
* Demonstrates competency in the management of critically ill children
* Demonstrates competency in management of peripartum obstetric emergencies
* Demonstrates competency in providing safe patient transfer (intra and interhospital)

### Intensive Care Professionalism

* Proper understanding and application of the continuity of care after ICU discharge
* Competency to lead ICU round, formulate management and supervise junior trainees
* Demonstrates competency in decision making in the ICU settings
* Demonstrates competency in management the process of end-of-life care and withdrawal of treatment
* Effective family communications, providing follow up, updates, support and delivering clinical decisions
* Effective communications with colleagues in consultations and hand-over settings
* Competency to lead multidisciplinary meetings
* Proper understanding of the ethical and legal principles appropriate to critically ill patients

### Intensive Care Procedures

* Demonstrates competency in performing fiberoptic bronchoscopy and bronchoalveolar lavage BAL
* Demonstrates competency in inserting and managing chest drains
* Demonstrates competency in performing transthoracic pacing
* Demonstrates competency in performing defibrillation and cardioversion
* Demonstrates competency in performing lumbar puncture and measurement of CSF tension
* Proper utilization of advanced monitoring tools
* Demonstrates competency in performing paracentesis
* Demonstrates competency in performing regional and nerve blocks in the ICU for analgesic purposes
* Demonstrates competency in performing/assisting in/describing pericardiocentesis
* Demonstrates competency in performing/assisting in/describing pulmonary catheter

### Miscellaneous anesthetic competencies:

* Demonstrates an understanding of risks and limitations of anesthetics in remote areas
* Proper anesthetic planning, preparation and management in remote areas
* Perioperative management of procedures out-of-theater and in remote areas
* Proper airway management during bronchoscopy and the ability to use different modalities
* Demonstrates an understanding of the physiological changes during ECT
* Proper perioperative safe management for bronchoscopy procedures (adult and pediatric)
* Demonstrates competency in providing safe sedation to different age groups
* Proper utilization and selection of different sedation technique for variable procedures

### Professionalism:

* Demonstrates professional attitude and respect to patients and co-workers
* Proper understanding of the senior doctor non-clinical responsibilities
* Leadership skills in clinical and non-clinical tasks
* Leadership skills in supervising and evaluating junior trainees
* Engagement in the quality improvement projects
* Proper understanding of the legal and ethical aspects of confidentiality
* Demonstrates professional communications skills with patients and colleagues
* Demonstrates professional teamworking skills
* Demonstrates professional time management skills (e.g., theater/ICU utilization)
* Proper understanding and application of the safety measures and precautions

**Doctorate course matrix**

|  |  |  |
| --- | --- | --- |
| **Units** | **A** | **B** |
| **Knowledge and understanding** | **Intellectual skills** |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **1** | **2** | **3** | **4** | **5** | **6** |
| Anesthesia | **\*** | **\*** | **\*** | **\*** | **\*** | **\*** | **\*** | **\*** | **\*** | **\*** | **\*** | **\*** | **\*** | **\*** |  |
| Physics & measurements |  |  | **\*** | **\*** | **\*** |  |  |  |  | **\*** |  |  |  |  |  |
| Pharmacology | **\*** | **\*** | **\*** |  |  | **\*** | **\*** |  |  | **\*** |  |  |  |  |  |
| Thesis |  |  |  |  |  |  |  | **\*** | **\*** |  |  | **\*** |  |  | **\*** |

|  |  |  |
| --- | --- | --- |
| **Units** | **C** | **D** |
| **Professional and practical skills** | **General / transferable** |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **1** | **2** | **3** | **4** | **5** | **6** |
| Anesthesia | **\*** | **\*** | **\*** | **\*** | **\*** | **\*** | **\*** |  | **\*** | **\*** | **\*** | **\*** | **\*** | **\*** |
| Physics & measurements |  |  | **\*** | **\*** | **\*** |  |  |  |  |  | **\*** | **\*** | **\*** |  |
| Pharmacology |  | **\*** |  |  |  |  |  |  |  |  | **\*** |  |  |  |
| Thesis |  |  |  |  |  |  |  | **\*** |  |  | **\*** |  |  | **\*** |

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| **Course Coordinators** |
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