Faculity Of Medicine
Anesthesia and intensive care

Programme Specification

A- Basic Information

1- Programme title: Anaesthesia & Intensive care.
2- Programme type: Single √ Double……. Multiple……..
3- Department (s) :Anaesthesia & Intensive care.
4- Coordinator : **Dr. *Eslah Elgendy & Dr. Nagia Abd Elmoti.*** ***Faculty of medicine For Girls***
Dr.Hassanin abdel karim Hamzawy. Dr. Mona Hanem AbdelGhaffar .
Dr.Ezz ELdeen Ismail Fikry ***Faculty of medicine For boys***
5- External evaluator(s):…….
6- Last date of programme specifications approval:…….

B- Professional information

1- Programme aims:

The programme should provide:

- Recent scientific knowledge essential for the mastery of practice of anesthesiology 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 peri-operatively.
- Understand the assessment & treatment of critical ill patient & management of pain.
- The graduate should receive training in complex technology of physics, equipment and relevant clinical measurement associated with anaesthesia & intensive care.

2- Intended learning outcomes (IL0s)

A- Knowledge and understanding:

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

a1 - Recent facts, theories of the anaesthesia and related subjects

a2- Recent advances in practice of anaesthesia, intensive care and pain management.

a3- Details of ethical and legal practice.

a4- Design, conduction, publishing of scientific research.

a5- Demonstrate a working knowledge of the physics and relevant clinical measurements for different monitoring devices and anaesthesia machine.

a6- Quality standards of the practice.

a7- Describe the scientific bases of all forms of anaesthesia, regional analgesia, critical care and pain management.

B- **Intellectual skills**

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

b1- Emphasize basic concepts of rotation in anaesthesia of general surgery, plastic, pediatric, obstetric and gynecology, neurosurgery, orthopedic, ENT, ophthalmic, vascular surgery, cardiothroax, intensive care & pain management.

b2- analyze the results of clinical and investigatory findings to formulate anesthesia plane.

b3- Deduce & formulate the management strategy for critically ill patients.

b4- Predict complications of postoperative period and formulate management strategy.

b5- Solve the majority of problems and take decisions in various professional situation.

b6- Improvement approaches to practice and conduct research studies that add to anaesthesia knowledge.

b7- Publish scientific articles and papers in journals.

C- Professional and practical skills

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

c1- Administer competently in all basic and recent skills of types of anaesthesia in all age groups for both elective and emergency situations.

c2- Acquire the skills of carful preoperative assessment, consultation for, interpretation of clinical data and laboratory results.

c3- Demonstrate clinical and technical competence in surgical intensive care & pain management unit.

c4- Apply the principals of sterile techniques & infection control guide line.

c5- Write and appraise reports.

c6- Understand and improve all methods and tools used in anaesthesia & intensive care.

c7- Teach and plan professional development courses to improve practice and performance of juniors.

D- General and transferable skills

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

d1- Communicate effectively with patients and their families.

d2- Use different sources of information to obtain data.

d3- Work as a team leader.

d4- Manage scientific meetings, utilize extrapolate and evaluation of information and discussions on basis of evidence and proves.

d5- Teach and evaluate others.

d6- Use information technology to improve her professional practice.

E- Academic standards

3 a- External references for standards (Benchmarks)

.....
.....NARS.....
.....
……..

3b- Comparison of provision to external references

Domain	NAQAAE	programme
Knowledge & Understanding	**Graduate must have sufficient knowledge & understanding of**: • Basic facts theories, of the specialty and related subject fields. • Mutual relation between professional practice and effects on environment. • Recent advances in the field of practice. • Details of ethical and legal practice. • Quality standards of the practice. • Design conduction & publishing of scientific research. • Ethical considerations in different types of scientific research.	 a1 a5 a2 a3 a3 a4 a5

Professional&		

Practical skills	• Coinpetent in all basic and all required advanced professional skills (to be determined according to the specialty board/ department). • Write and appraise reports. • Evaluate methods and tools use in specialty. • Use technology to advance practice. • Plan professional development courses to improve practice and enhance performance of juniors.	**c1** **c4** **c2** **c3** **c5,c6**
General & transferable skills	• Communicate effectively using all methods. • Use information technology to improve his/her professional practice. • Teach and evaluate others. • Perform self appraisal and seek continuous learning. • Use different sources of information to obtain data. • Work as team leader as well as a member in larger teams. • Manage scientific meetings and appropriately utilize extrapolate & evaluation of information.	**d1** **d9** **d5** **d6** **d2** **d3** **d4**

F- curriculum Structure and Contents:

- **4.a- Programme duration:** Two years.
- **4.b- Programme structure:**
  - **4.b.i- No. of hours per week: - Lectures 12 hr. - Lab./ Exercise: 24 hrs. - total: 36 hrs.**
  - **4.b.ii- No. of credit hours: Compulsory Elective optional**
  - **4.b.iii-No. of credit hours of basic sciences courses: No. %**
  - **4.b.iv- No. of credit hours of courses of social sciences and humanities. No. %**
  - **4.b.v- No. of credit-hours of specialized courses: No.**
  - **4.b.vi- No. of credit hours of other courses: No.**
  - **4.b.vii- Practical/Field Training: ……**
  - **4.b.viii-Programme Levels (in credit-hours system):**

5- Programme courses

5.1- Level/Year of Programme: Semester...1.....
a. Compulsory

Code No.	Course Title	No. of Units	No. of hours /week					Programme ILOs Covered (By No.)
			Exer.	Lab.	Lect.			
	- Anaesthesia - Pharmacology - Physics & measurement Case report		16 4 4		9 1 2			

6- Programme admission requirements:

يشترط فى قيد الطالب لدرجة العالمية (العالمية):

- **أن يكون حاصلا على درجة ماجستير الطب فى مادة التخصص أو احدى المواد المتصة بها بتقدير جيد على الأقل من جامعة الأزهر أو من احى جامعات جمهورية مصر العربيه أو على درجة معادلة من معهد علمى معترف به من الجامعة على ان يكون ممارسا للتخصص وقت التقدم للقيد.**
- **أن يحضر المقررات الدراسية التى يقدمها مجلس القسم ويقرها مجلس الكليه.**
- **أن يقوم ببحث مبتكر فى موضوع يقره مجلس الجامعة بعد موافقة مجلس الكلية لمدة سنتين على الأقل من تاريخ القيد.**
- **أن يقدم نتائج بحوثه فى رسالة تقبلها لجنة الحكم بعد مناقشته فيها مناقشة علمية.**

7- Regulations for progression and programme completion:

الإختبارات:

- **اختبار تحريرى من ورقتين فى التخدير لمدة ثلاث ساعات.**
- **اختبار تحريرى مدته ثلاث ساعات فى الفارماكولوجى والطبيعة والقياسات الاكلينيكية فيما له علاقة بالتخصص.**
- **اختبار تحريرى لمدة ساعة ونصف لحاة يتولى الطالب شرحهاوتشخيصها ووصف علاجها.**
- **اختبار شفوى فى التخدير.**
- **اختبار شفوى فى الفارماكولوجى والطبيعةوالقياسات الإكلينيكية فيما له علاقة بالتخصص.**

Evaluation of programme intended learning outcomes:

Evaluator	Tools	Sample
1- Senior student	**Survey & questionnaire**	**50%**
2- Alumni	**Focus group**	**50%**
3- Stakeholders (employers)	**Round table discussion**	**50%**
4- External evaluator(s) (external examiner(s))	**Report**	
5- Other		

Course Specification

1- Course data

- **Corse code : ATC 1000.**
- **Course title : Anaesthesia And Intesive Care.**
- **Academic year / Level : M.D. Degree in anaesthesia & intensive care.**
- **Specialization: Anaesthesia And Intesive Care.**
- **No. of Instructional Units : Lecture : 864 hr. - Practical : 1920 hr.**

2- Course Aim

The aim of this course is to provide the postgraduate with the 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 Anesthesiology 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 peri operatively.
- 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 anaesthesia & intensive care.
- Learn and train other anaesthesia trainers the principal of delivering safe and smooth aesthesia for common operation.
- 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 anaesthesia and Post-operative intensive care.

3- Intended learning outcomes ILOs:

A- Knowledge and understanding:

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

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

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

A3. Know the complication of anaesthesia, 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 of, reversal of pharmacodynamics & 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 Surgical 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 anaesthesia plan and Proper selection of patient.

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

B3. Conduct research studies that adds to knowledge.

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

B5. Identify anesthesia and intensive care unit problems and find solutions.

B6. Write and publish scentific articles and papers in journals.

C- Professional and practical skills

By 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 carful 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 anaesthesia & intensive care.

C5- Apply the principal of sterile techniques and infection control guide lines.

C6- Train 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 and transferable skills:

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

D1- Communicate effectively with patients and their families.

D2- Communicate effectively with other health care providers & work coherently & successfully as a part of 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- Mange scientific discussion based on scientific evidences and proofs.

4- 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
Peri-operative 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 Cardiovascular physiology & Anesthesia for cardiothoracic surgery	20 40	40 200
Defibrillator & DC shock	3	10
Cardiac pacing	3	10
Aortic balloon pump	3	6
ECHO cardiography	3	10
Anesthesia for thoracic surgery	25	60
Anesthesia for vascular surgery	20	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
Acute (postoperative) pain	8	20
Management of chronic pain	12	30
Interventional pain therapy	12	30
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 & Laser in Anesthesia	20	60

Computer in relation to anesthesia	10	--
Medical statistics	10	--
TOTAL	864	1920

Thesis, then final examination

5- Teachin and Learnin Methods

- **Lectures and tutorials**
- **Practical and clinical cases**
- **Workshops and simulators**
- **Case study.**

6- Student Assessment Methods

A- Procedure used -

- **Final written exam: to assess knowledge and intellectual skills.**
- **Final oral exam: to assess knowledge and intellectual skills.**
- **Final practical exam: to assess practical and intellectual skills.**
- **Final clinical Exam: to assess practical and intellectual skills.**

B- Schedule:

Final written Exam:

- **first-paper.**
- **second paper.**
- **case study (commenthry).**
- **basic science (pharmacology , physics & measurements).**

Final oral Exam anaesthesia.

Final oral exam pharmacology.

Final oral exam (physics & measurements).

C- Weighing of assessments:

- **Final written Exam:**
  - **first paper : 100**
  - **second paper : 100**
  - **case study (commentary) : 100**
  - **basic science (pharmacology , physics & measurements) : 200**
- **Final oral Exam anaesthesia : 100**
- **Final oral exam pharmacology: 50**
- **Final oral exam (physics & measurements): 50**

Total 700 Marks

Faculity Of Medicine
Anesthesia and intensive care

Dectorate 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 & measurments			*	*	*					*					
Pharmacology	*	*	*			*	*			*					
Thesis								*	*			*			*

Units	C								D					
	Professional and practical skills								Genral / transferable					
	1	2	3	4	5	6	7	8	1	2	3	4	5	6
Anesthesia	*	*	*	*	*	*	*		*	*	*	*	*	*
Physics & measurments			*	*	*						*	*	*	
Pharmacology		*									*			
Thesis								*			*			*

7- List of References

A- Course notes

B- Required books (text books):

- Basics of Anesthesia: by Stoelting RK and Miller RD, 5th edition, Churcill Livingstone.
- Morgan G.E, Mikhail M and Murry M., (2008): Clinical anesthasicilogy, 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: Anestheic Pharmacology 1st edition 2003.
- Basic physics & measurement in anesthesia; Davis P.D., Parbrook G. D. and Kenny C.N., 4th edition, Bu erworth Heirmann, 1995.

C- Recommended books

- David E. Longnecker: Anaesthesiology, (1st edition, 2007).
- Alan R Aitkenhead: Texbook of anaesthesia(5th edition, 2007).
- Miller R.D., Cucchiara RF et al, (2000): Anesthesia, 5th edition.
- Mechanical Ventilation - Maclntyre N R Branson R D 2008.
- Text book 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 Anaesthesiologists (2nd edition 2005).
- Godman Gilmans. The pharmacological therapeutics. 11th Ed, 2006.

D- Periodicals Web Sites:

- British Journal of Anaesthesia.
- ASA Refresher Course Lectures.
- Anesthesiology.

- Anesthesia Analgesia.
- Egyptian journal of anesthesia.
- JAMA.
- Lancet.
- www.anaesthesiauk.com
- www.pharmacology2000.com
- www.freshgasflow.com.

Course Coordinator

1- Prof. Eslah Elgendy
2- Prof. Nagia Abd-Elmoeti **Head of the department**

Prof. Mervat Saeed

Date 20 / 4 / 2013

Faculity Of Medicine
Anesthesia and intensive care

Pharmacology Course Specification

1- Course Data Course:

- **Code: ATC. 1002**
- **Academic year / Level: M.D. degree in Anesthesia & ICU.**
- **Specialization: Anesthesia & ICU.**
- **Course Title: Pharmacology**
- **No. of Instructional Units: Lecture: 96 hr. Practical: ……..**

2- 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.

3- Intended Learning Outcomes (ILOs):

A- Knowledge and understanding:

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

A1- Identify the pharmacokinetic principles affecting drug actions.

A2- Discuss the pharmacodynamics principals regulating drug action.

A3- Describe the pharmacotherapies of cardiac dysrhythmias, hypertension, heart failure, ischemic heart disease and dyslipidemias.

A4- Describe the pharmacotherapies of shock, diabetes mellitus, bronchial Asthma, epilepsy, coagulopathy and sepsis.

A5-Recognize the pharmacotherapies in endocrinal emergencies.

B- Intellectual skills:

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

B1- Correlate between the medical condition of the patient and the drug that will be used for treatment.

B2- Evaluate the appropriate dosing of drugs according to the different characteristics of patient.

B3- Evaluate the different pharmacotherapies of acid-base balance disorders.

B4- Evaluate the different agents used in general and local anesthesia.

B5- Assess the different drug adverse reaction and toxicities.

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:

C1- Appraise the different clinical pharmacology principles that should be applied to define the appropriate medicine.

C2- Report the different drug adverse the reaction and toxicities.

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:

D1- Communicate effectively with other health care professionals to maximize patient benefits and minimize the risk of errors.

D2- Transfer the knowledge and skills of selecting and using the different agents used in general and local anaesthesia.

D3- Transfer the knowledge and skills of selecting and using the different Uses of skeletal muscle relaxants.

D4- Handle data appropriately and analyze them through decision processes, objective criteria, problem definition and evaluation.

4- Course content

Topics	No of hours	
	Lecture	Practical
Introduction Pharmacokinetics & pharmacodynamics	**2**	
Autonomic nervous system	**5**	
IV induction anaesthesia inhalational anaesthatics	**5**	
Neuromuscular blocking drugs	**4**	
Antcholinesterases	**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**	

5- Teaching and learning Methods:

- **Lectures**

6- Student Assessment

a- Procedures used:

- Written exam to assess knowledge and intellectual skills.
- Oral exam assess knowledge and intellectual skills.

b- Schedule:

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

c- Weighing of assessment:

- Final written exam 100 marks
- Final oral exam 50 marks

Total 150 marks

7- List of text books and References:

a- Course Notes:

- **Lecture Notes by professors of Pharmacology department.**

b- 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 patophysiologic basis of drug therapy. Eds. Golan et al. 2nd edition. 2008. Lippincott.

c- Periodicals

- British J. of pharmacology.
- American J. of pharmacology
- Lancet J.
- JAMA J. –
- Web Sites: Pubmed: http**://**wwwmcbLnimmih.gov/PubMed.....etc

Faculity Of Medicine
Anesthesia and intensive care

Course Coordinator
1- Prof. Eslah ElgendY **Head of the department**
2- Prof. Nagia Abd-Elmoeti **Prof. Mervat Saeed**

PHYSICS AND MEASURMENT
Course Specification

1- Course data:

- **Course code: ATC 1002**
- **Course title: PHYSICS AND MEASURMENT**
- **Academic year / Level: M.D. degree in anaesthesia & ICU.**
- **Specialization: Anaesthesia & ICU.**
- **No. of Instructional Units: Lecture: 192 hr. Practical 384 hr.**

2- 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 anaesthesia.
- Describe the principles and uses of monitoring devices.
- Understand the clinical measurement in anaesthesia either direct or indirect.

3- Intended Learning Outcomes of Course (ILOs):

A- Knowledge and Understanding:

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

A1- Describe definition of the heat; ambient, latent, clinical application, transfer of heat.

A2- Demonstrate laws of gases; Boyle's, Charle's, Lussac, Dalton, Kelvin scale, equation of state of perfect gas.

A3- Explain liquefaction of gases; critical temp, critical pressure, physical properties of gases, clinical application of gas cylinder.

A4- Demonstrate solubility of gases in liquids; factor affecting solubility, solubility coefficient, blood/gas partition coefficient.

A5- Define diffusion of gases; physical factors affecting diffusion, factors fleeting diffusion of gases across pulmonary membrane.

A6- Illustrate and explain flow of fluid through uniform tube, through tubes of variable diameters and through orifice.

A7- Identify properties of gases, liquid& vapor; density, specific gravity, viscosity, timidity, surface tension, osmotic pressure & clinical application.

A8- Describe Vaporization & vaporizer; properties of vapor, vapor pressure curve, types of vaporizers, factors affecting design, calibrations, factors affecting performance.

A9- Explain humidifier; types, advantages, mechanism, complications.

A10- Mention mechanical ventilators; types, criteria, ventilation - perfusion disturbance.

A11- Describe anaesthetic breathing system and gas scavenging.

A12- Illustrate pressure reducing valves; types, advantages, physical principles.

A13- Mention and explain fires & explosion; prevention, source, ignitable anesthetics**.**

A14- Demonstrate nuclear physics and ionizing radiation; atomic structure, radioactivity, measurement of radiation.

A15- Mention and explain measuring system; sensor, processor, recorder, units of measurement.

A16- Define derived mechanical units; measurement of pressure, temp, humidity, volume, blood loss, measurement of flow, blood flow, gas flow.

A17- Illustrate analysis of gas mixture acid-base state; measurement of 02 tension, co2 tension, PH, acid-base evaluation.

A18- Mention and explain monitoring of cardiovascular system; arterial blood pressure, ECG, central venous catheterization, pulmonary artery catheter, cardiac output.

A19- Explain monitoring of respiratory system; pulse oximetry, capnography, anesthetic gas analysis.

A20- Mention monitoring of CNS: electroencephalography, evoked potentials BSI.

A21- Mention muscular monitoring; peripheral nerve stimulator.

A22- Identify physical principals of laser electricity and ultra sound in relation to anaesthesia practice.

B- **intellectual Skills**:

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

B1- Correlate between the state of the anesthetized patient and the parameters that observed.

B2- Integrate the effect of calibrated equipments on the patient.

B3- 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:

C1- Evaluate anaesthetic equipment and how to check proper performance of anaesthetic machine and different equipments.

C2- Practice different techniques and methods for measurement of different vital data adequately in a proper time with minimal errors.

C3- Define the appropriate equipment.

C4- Deal with alarming of anaesthetic machine and different apparatus.

D- General kills:

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

D1- Communicate with each others 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.

D2- Present plan for test the anesthetic equipments in accordance with the standard scientific guidelines.

D3- Manipulate computer programs, do web search, to write an essay about patient with certain problems due to anesthetic equipments and with trial of solving.

D4- Work together to check anesthetic equipments integrity and discuss their point of view.

4- 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, pace maker, 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**

5- Teaching and learning method:

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

6- Student Assessment

a- Procedures used:

- Written exam: to assess knowledge and intellectual skills.
- Oral exam: to assess knowledge and intellectual skills.
- Practical exam: too assess practical and intellectual skills.

b- Schedule:

- Written exam to assess knowledge and intellectual skills.
- Oral exam assess knowledge and intellectual skills**.**
- Practical exam: too assess practical and intellectual skills.

c- Weighing of assessment:

- Final written exam 100 marks
- Final oral exam 50 marks

Total 150 marks

d- List of text books and References:

a- Course notes: -

- **Lectures**

b- Required text books:

- 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 Anaesthesia 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.

c- **Recommended Books:**

- Understabding Anesthesia Equipment by Jerry A. Dorsch, Susan E. Dorsch. Published by Lippincott Williams & Wilkins, 5th edition, 2007.
- Physics Applied To Anaesthesia By D.W. HILL, London. Published by Butterworth. 3rd ed, 1976.

d- Periodicals, Web Sites:

- www.anaesthesiauk.com/default.aspx
  www.pharmacology2000.com/physics1Chemistry_Physics/physics'.htm
  www.freshgasflow.com/index.html

Course Coordinator
Pr-of:Eslah-Elgendy-
Prof. Nagia Abd-Elmoeti

Head of the department

Prof. Mervat Saeed

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