



**SRM**  
UNIVERSITY  
(Under section 3 of UGC Act 1956)



## **MD Anaesthesiology**

Curriculum and Syllabus 2015

Branch Code: 12

**SRM Medical College Hospital & Research Centre**

SRM University

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# MD. ANAESTHESIOLOGY

## Preface

### 1.Goal & objectives

This curriculum has details of the training objectives; schedule, methods, and syllabus for a post-graduate student in Anaesthesiology .There are lists of skills the student must acquire in various procedures & surgical techniques during the training. Detailed theory syllabus, with text books and journals to be referred by the students are incorporated. The curriculum emphasizes on the maintenance of log book for recording the day to day activities carried out by the students. Detailed guidelines for carrying out research and thesis are also included.

### Objectives of training

To enable the student to function as a specialist anaesthesiologist, well trained in practice of Anaesthesia, Critical Care, Pain Management, Resuscitation of all acute or acute on chronic conditions and as a trainer imparting such knowledge to the doctors in training and subordinate ancillary medical staff. To this end he should possess diagnostic skills as well as skills with laboratory procedures, and current technologic tools, their judicious use and sensible interpretation of various clinical settings in depth knowledge of all basic sciences and all disciplines of clinical medicine.

To ensure that student develops dedication to the speciality, the patients under his care, the institution and be able to work as a team with Surgeons, Nursing staff, Hospital administration and with other Clinicians, understanding, adjusting and instructing wherever necessary with a balanced mind and leadership qualities.

To facilitate the student develop a thorough grasp of the Pharmacokinetics and Pharmacodynamics and interaction of all anaesthetics and allied drugs which he will be using or which the patient has already been taking.

To ensure he develops knowledge of cardiovascular, respiratory, renal, hepatobiliary, hormonal and neurologic systems of the body

To ensure he possesses adequate knowledge of the physical principles on which are based the anaesthetic monitoring and resuscitation gadgets he is likely to use, understanding the functioning of each and feasibility of their use in different clinical presentations of a patient.

#### Goals to be achieved by an individual at the end of MD training

In a broad perspective, students should be able to demonstrate good understanding of clinical anaesthesia practice, effectively manage critically ill patients including resuscitation, effectively provide emergency trauma care, and gain experience in pain management.

He should have precise concepts of doing basic clinical research and application of statistical analysis, in clinical medicine, medical audit, and medical record maintenance.

The students should develop an ability to discern when more senior assistance is required.

#### Overview

Perform preanaesthetic check of patients taking detailed history and a thorough Physical examination.

He should be familiar with the implications for anaesthesia of common medical conditions in particular respiratory diseases, cardiac diseases, hypertension, endocrine diseases, liver, renal disease, and plasma & electrolyte imbalance

Categorize patients according to ASA (American Society of Anesthesiologists) risk grading. Recognize anaesthetic problems in high-risk patients and select further investigations and referral for expert opinion for dealing with specific problems.

He should be able to interpret relevant preoperative investigations X-ray, ECG, plasma electrolytes, pulmonary function and clotting abnormalities.

He should be familiar with anaesthetic implications of current drug therapy and order appropriate premedication

Patient / guardian consent for anaesthesia after proper explaining of the anaesthetic procedure, its advantages and any complications.

Apply guidelines regarding restriction of food and fluid by mouth, correction of dehydration and cessation of smoking.

Familiar with routine anaesthetic equipments and their usage, complete check for oxygen and other gases supply. (cock pit drill)

### General anaesthesia

He should be able to induce, maintain anaesthesia and reverse the patient efficiently. He should be familiar with intravenous inhalational anaesthesia, indications for tracheal intubation, recognize correct placement of the tracheal tube, prevention and management of pulmonary aspiration. He should be able to induce anaesthesia in special circumstances like head injury, full stomach and upper airway obstruction.

He should be able to deal with emergencies before, during and after anaesthesia and stabilize a patient's condition. He should be well versed with the techniques of maintenance of anaesthesia.

He should be able to find the causes and treatment of failure to breathe at the end of operation, care unconscious patient and pulmonary ventilation.

Perform the following procedures related to general anaesthetic independently- Endotracheal intubation, nasal and oral under difficult situations eg. awake intubation, blind nasal intubation, and Intubation with double lumen tube. He should perform bronchoscopy using fibre optic bronchoscope. Maintain airway by using mask ventilation. Maintain airway by using different types of laryngeal mask airway.

### Regional anaesthesia

Student should be thorough with the indications, technique and management of spinal, epidural including caudal approach, Peripheral Nerve blocks, (Brachial plexus, femoral nerve, inguinal field block, intravenous regional anaesthesia). He should be familiar with local anaesthesia for tracheal intubation.

### Anaesthesia in special circumstances

He should be familiar with principles of management of obstetric anaesthesia (including labour analgesia) anaesthesia for infants and children, obese patients, patients with communicable diseases including hepatitis B and HIV, laparoscopic surgeries, day care surgeries and patients with cardio diseases including patients with pacemaker.

Administer anaesthesia to patients for emergency surgery, management of the-Organ Transplant surgery, Limb replantation and reconstructive surgeries

Anaesthesia in difficult situations -like MRI, Dental chair, endoscopic and airway-sharing procedures, camp anaesthesia, high altitude and laser surgery.

He should be able to manage anaesthesia for electro convulsive therapy.

He should be well versed with anaesthesia for burns victims

He should be familiar with blood products transfusions, their indications, limitations and hazards. He should be able to Assist/Perform central venous cannulation and arterial line.

### Intensive care medicine

Students should be well versed in management of critically ill patients, monitoring and life support measures, mechanical ventilation, weaning and stabilization.

An awareness of the importance of communication skills and interpersonal skills will be expected.

### Resuscitation

He should be familiar with the international guidelines for resuscitation and care of patients. (DAS guidelines, AHA guidelines)

A student should be able to perform BLS, ACLS and ATLS as per the protocol followed in the hospital.

### Pain management

Detailed knowledge of the control of acute pain in the context of post operative and post-traumatic conditions is expected. An understanding of the principles of chronic pain management including assessment, drug therapy, and intervention is expected.

### Nutrition

He should know the requirements for enteral and parenteral nutrition and maintain critically ill patients in warranting situations. Initiate, maintain and wean patients from ventilators in ICU settings.

### Infection control

He should have a thorough knowledge of sterilization, asepsis and disposal of soiled and unsterile equipments.



## Clinical program

The residency program in Anaesthesiology is of three years duration.

### First year (PGY-1)

During this year residents do rotations in adult Anaesthesiology. Residents learn fundamental knowledge, clinical skills and techniques required for routine and emergency surgery.

A mandatory module on biostatistics and research methodology will also be provided. The student is expected to finalize the topic for research and start the work under his guide.

### Second year (PGY-2)

During this year residents receive training in intensive care, pain management, and anaesthesia for special situations. A mandatory training in cardiology, Neurology, respiratory medicine, paediatric & adult intensive care is provided.

The research work should be conducted during this year.

### Third year (PGY-3)

The residents use this year to broaden their exposure to clinical Anaesthesiology through rotations at all major suites and are given increasing responsibility for patient care.

The research projects should be completed. Steps are taken to prepare for their examinations.

## Academic program

### Intensive orientation program

This program consists of intensive programs of 10-15 sessions. It involves reading assigned materials, didactic lectures, hands on simulation based experience and pre and post exam.

### Resident seminar program

This covers the basic areas of anaesthesiology, like applied anatomy, and applied physiology. The resident will be freed from clinical duty to attend this. The teaching format includes resident presentations and lectures.

### Case based learning sessions

The resident has to present anaesthetic management during specific case scenarios under a guide.

### Problem based learning sessions

The residents in group will discuss and chart out the all the problems associated with the scenario provided on their own under a mentor

### Journal club

Held bi- weekly or monthly during the academic year. This is presented by the residents with faculty guidance.

### Research

Residents can gain research experience by joining departmental clinical projects or other research groups.

In addition the residents are expected to attend the weekly morbidity/mortality meetings, and medical audit.

### Simulation

Students will be having access to simulation laboratory where small group sessions will be conducted.

### Appraisal

Students will be trained and made to certify in BLS, ACLS and ATLS programs

During his three years of residency he will be groomed to make one paper and poster presentation in any state or national conferences.

## 2.Course Overview

### Duration of the Course

The period of certified study and training for the Post-Graduate MD ANAESTHESIOLOGY shall be Three Academic years (six academic terms). Each academic term shall mean six months training period.

### Commencement of Academic Session

The academic session for the Post-Graduate shall commence from May / June of the Academic Year.

### Date of Examination

The students admitted up to May/ June of the academic year shall be registered for that academic year and shall take up their Final Third Year regular examination in April/October of the academic year after completion of 3 years/36 months.

### Number of Examinations

The University shall conduct not more than two examinations in a year, for any subject, with an interval of not less than 4 and not more than 6 months between the two examinations.

### Attendance

All students joining the postgraduate training programme shall work as full time residents during the period of training, attending not less than 80% (eighty percent) of the training during each calendar year, and will be given full time responsibility, assignments and participation in all facets of the educational process.

The period of training for obtaining the degrees shall be three completed years including the period of examination.

### **3.Syllabus**

At the end of three years of training as residents in Anaesthesia, the students should be fully conversant with theory and practical aspects of -

#### **1. Human Anatomy and Physiology**

Various organ systems and cellular components in relation to Anaesthesia including muscles, neuromuscular junction, nerve plexuses, cardiovascular, respiratory, neurological, hepatobiliary, renal, endocrine and temperature homeostasis, theories of mechanism of production of anaesthesia, changes during pregnancy, various tests/investigations to evaluate the functional status of organ systems as applied to Anaesthesia Management, Intensive Care Practice and Pain Relief.

#### **2. Pharmacology**

As applied to Anaesthesia, Intensive Care Practice and Pain Relief including General Pharmacological Principles, Pharmacokinetics and Pharmacodynamics of Anaesthetic Drugs (including Uptake and Distribution of Inhaled Anaesthesia agents and All the Adjuncts used in Anaesthesia, Drugs used for treatment of various Diseases and Drug Interaction)

#### **3. Pathophysiology of various diseases**

Including disorders of cardiovascular, respiratory, neurological, hepatobiliary, renal, endocrine and immune systems, various tests/investigations to grade/measure the disease process of various organ systems as applied to anaesthesia management, intensive care practice and pain relief.

#### **4. Medicine**

As applied to the practice of Anaesthesia including diagnosis and management of Diabetes, Hypertension, Bronchial Asthma, Chronic Obstructive Pulmonary Diseases, Respiratory Failure, ARDS, Myocardial Ischemia / Infarction, Arrhythmia, Shock, Congestive Heart Failure, Acute / Chronic Renal Failure, Head Injury, Unconscious patients, Status Epilepticus / Asthmaticus, Endocrine Disorders, Diseases related to Dysfunction of Hepatobiliary, Muscular, Connective Tissues and Immune system, Management of Perioperative Infection, Neuromuscular Disorders, Poisoning etc. and interpretation of ECG / Blood Gases / Other Biochemical Values and Function Tests.

## 5. Physics

As applied to Anaesthetic gases, vapours, anaesthesia machine, breathing systems, monitors, ventilators, therapeutic devices & other relevant equipment including physical principles involved in their construction and functioning.

## 6. Perioperative Anaesthesia management

Including pre-operative evaluation, intra-operative management as well as postoperative care, monitoring (invasive as well as non-invasive) as applied to various surgical specialities and age groups.

7. Theory and practice of various techniques / aspects of Routine & Emergency cases of General Anaesthesia (e.g., Intravenous / Inhalational, Endotracheal / Mask / LMA / COPA, Spontaneous/Controlled mode of ventilation, induced hypotension / hypothermia etc.), Regional Blocks (Spinal, Epidural & Peripheral Nerve block) and Local Anaesthesia, including various postures required for anaesthetic/surgical procedures, their effects and recent advances for most minor to supra major surgeries in the field of:

- General surgery:

Minor cases like haemorrhoidectomy to supra major cases like Liver transplant.

- Gynaecology and Obstetrics
- ENT and Head & Neck
- Orthopaedics
- Ophthalmology
- Pediatric & Neonate:

Differences between adult and pediatric Anatomy, Physiology, Pharmacology, Anaesthesia principles, pediatric/neonatal emergencies, postoperative care, fluid & ventilator management etc.

- Cardiac, Vascular & Thoracic:

Conduct of closed heart as well as open heart surgeries (Valvular, Ischemic, Congenital -Cyanotic & Acyanotic), CABG (including off pump), Pulmonary Cases (Insertion of Double Lumen Tube, one lung anaesthesia), Thymus and Vascular surgeries etc. Ability to go on Cardiopulmonary bypass and disconnect from bypass, Ability to take, manage and interpret Arterial,

Central Venous and P.A. Lines, postoperative care, management of re-explorations etc.

- Neurosurgery

Ability to monitor ICP, Management of head injuries, bleeds, tumours, etc with raised ICT. Ability to safely manage cases in sitting, prone, lateral, jack-knife positions and Anaesthetic management for neuroradiology procedures.

- Urology

Management of endoscopic surgeries like TURP/TURBT etc, Problems related to TURP, extracorporeal shock wave lithotripsy, percutaneous placement of nephrostomy etc., anaesthetic management of patients with acute and chronic renal failure, anaesthetic management of renal transplant cases of donor as well as recipient.

- Plastic

Management of burns contractures, congenital faciomaxillary abnormalities like cleft lip and palate, faciomaxillary injuries like fracture mandible, maxilla, zygoma, panfacial fractures, difficult intubations, microvascular surgeries, reconstructive surgeries, aesthetic surgeries etc.

- Dental

Monitored Anaesthesia Care, Anaesthetic management of pedodontia patients, maxillofacial surgeries including TMJ Ankylosis, Awake, Retrograde & Fiberoptic intubations.

- Endoscopies / laparoscopies

Anaesthetic management, specific requirement and complications of various endoscopies like cystoscopy, ureteroscopy, PCNL, hysteroscopy, thoracoscopy, mediastinoscopy etc. and Lap. Assisted/laparoscopic surgery like hysterectomy, tube ligation, appendicectomy, cholecystectomy etc.

- Anaesthesia for various diagnostic, therapeutic and specialized procedures.
- Anaesthesia for Geriatric patients.
- Anaesthesia for surgery using LASER.

- Anaesthesia / Sedation techniques outside operating room

Electroconvulsive shock therapy (ECT), Electrophysiologic tests, Radiofrequency ablation, Cardioversion, Cardiac catheterization, Special anaesthetic considerations in radiology and interventional radiology related to Dye allergies, Embolization, Monitoring / Equipment options in the MRI suite.

## 8. History of Anaesthesia

## 9. Airway Management

Assessment of difficult airway, Awake, Retrograde, Use of intubating LMA's, Intubating Stylets, Various laryngoscopes designated for difficult airway, Insertion of Combitube, Ability to perform Cricothyrotomy and use of Venturi, Minitrach & Fiberoptic intubations etc.

10. Basic & Advanced Cardiopulmonary & Cerebral Resuscitation (CPCR) For all age group of patients under different situations e.g., neonates, pregnant females, poisoning cases, trauma victims etc.

## 11. Acid base & Fluid management

Including use of Crystalloids, Colloids, blood & blood products.

## 12. Arterial, Central Venous and P.A. Lines

Establishment, management and interpretation.

## 13. Anaesthetic drugs used in perioperative care

## 14. Equipments (Minor to advanced monitoring) –

Their use, maintenance, sterilisation and care.

## 15. Medical gases

Knowledge of Manufacturing, Storage and Central pipeline Systems.

## 16. Day Care / Outpatient Anaesthesia.

## 17. Remote Location Anaesthesia

Anaesthetic practice during disasters and for large turnover surgeries in camps / mass casualties.

18. Emergency Anaesthesia.

19. Monitored Anaesthesia Care.

20. Labour Analgesia.

21. Pain relief :

Acute & Chronic.

22. Critical care practice

Including oxygen therapy, respiratory therapy, ventilatory support, haemodynamic monitoring, prevention and management of multi organ failure, and care of patients with brain damage or brain dead patients for organ Transplant.

23. Advanced Trauma Life Support (ATLS)

24. Occupational Hazards

25. Safety in Anaesthesia

26. Complications of Anaesthetic procedures, its prevention, detection and management.

27. Record keeping in Anaesthesia

28. Medical Audit

29. Quality Assurance

30. Anaesthesia standards: e.g., Minimum monitoring standard

31. Medicolegal aspects in Anaesthesia

32. Ethics in Anaesthesia

33. Principles of Evidence Based Medicine

34. Basic Research Methodology and Clinical Trials

35. Bio-statistics

36. Computers

Utility, computer assisted learning and data storage, Computerised anaesthesia records.



### 37. Skills

For planning of Operation Theater, pain clinic, recovery room, intensive care etc. including selection and purchase of equipments.

#### Tentative Schedule for Training

The postings to various stations can be guided by the following schedule; the time to be spent depends on availability and the duration of the course (3 years)

Duration : 3 years

1<sup>st</sup> Year : Orientation & Specialties

- General Surgery : 8 weeks
- Gynecology / Obstetric : 8 weeks
- Orthopedic Surgery : 8 weeks
- ENT Surgery : 8 weeks
- Pre – operative Assessment / Anaesthesia OPD : 2 weeks
- Monitored Anaesthesia Care : 2 weeks
- Forensic Medicine / Legal aspects : 1 week
- Record Keeping / Statistics : 1 week
- Special training in C.P.R/ Critical care : 2 weeks
- Ophthalmology surgery : 2 weeks
- Day care surgery : 2 weeks
- Obstetric analgesia / Anaesthesia : 2 weeks
- Trauma : 2 weeks
- ECT : 2 weeks
- Post Anaesthesia / Care / Recovery : 2 weeks

**2<sup>nd</sup> year : Specialities and allied**

- Neonatology / Pediatric : 2 weeks
- Geriatric / medicine cardiology / chest  
Endocrine : 6 weeks
- Casualty department : 2 weeks
- Pediatric surgery OT : 4 weeks
- Urosurgery : 4 weeks
- Plastic surgery OT : 4 weeks
- Cardio thoracic surgery O.T : 8 weeks
- Neurosurgery : 4 weeks
- Day care surgery : 4 weeks
- Radiology –CT Scan /MRI/IVP : 4 weeks
- Camp Surgery : 2 weeks
- Intensive care and PACU : 4 weeks
- Dental surgery : 2 weeks
- Cardiac Catheterisation : 2 weeks

### 3<sup>rd</sup> year : Specialities

- Trauma O.T : 2 weeks
- Urosurgery O.T : 4 weeks
- Paediatric surgery OT : 4 weeks
- Plastic surgery OT : 4 weeks
- Transplant surgery OT : 4 weeks
- Cardiothoracic surgery OT : 4 weeks
- Neurosurgery OT : 4 weeks
- Camp surgery : 4 weeks
- Forensic medicine / legal aspect : 4 weeks
- Critical care : 4 weeks
- Post anaesthesia care / Recovery : 4 weeks
- Pain management : 4 weeks
- Thesis completion & Presentation,  
Model examination (theory), mock clinical  
Examination with oral : 6 weeks

#### Emergency Anaesthesia

The post graduate student will do emergency duties once in every 6 days. The student will attend all emergency cases including casualty and caters to all areas where Anaesthesia service is required.

## Guidance on practical and clinical procedures

### Guidance on practical and clinical procedure

#### ASSIST / PERFORM

S. No	Procedure	1 <sup>st</sup> year		2 <sup>nd</sup> year		3 year	
		Assist	Perform	Assist	Perform	Assist	Perform
1	Endotracheal intubation	20	80	-	100	-	100
2	Laryngeal mask Airway	5	10	-	50	-	100
3	Drill for failed intubation	5	5	-	10	-	20
4	Double lumen tracheal intubation	2	-	5	-	-	5
5	Placement of endobroncheal blocker	-	-	5	-	5	5
6	Jet Ventilation	5	-	-	15	-	15
7	Endotracheal intubation in paediatrics	20	-	10	20	-	30
8	Endotracheal intubation in Neonates	5	-	10	10	-	10
9	Mechanical ventilation	5	20	20	50	-	50

#### REGIONAL ANAESTHESIA ANALGESIA

S. No	Procedure	1 <sup>st</sup> year		2 <sup>nd</sup> year		3 year	
		Assist	Perform	Assist	Perform	Assist	Perform
1	Subarachnoid block	5	50	-	100		100
2	Lumbar epidural block	5	5	-	50	-	50
3	Caudal epidural block	5	5	-	20	-	20
4	Combined spinal and epidural block	5	5	-	20	-	20
5	Periperal nerve block	2	5	-	10	-	10
6	IVRA (Bier's block)	2	5	-	10	-	10

**CANNULATION**

S. No	Procedure	1 <sup>st</sup> year		2 <sup>nd</sup> year		3 year	
		Assist	Perform	Assist	Perform	Assist	Perform
1	Intra Venous	-	200	-	200	-	200
2	Central Venous line jugular	5	10	-	20	-	20
3	Subclavian vein	2	-	5	10	-	20
4	Radial artery	2	-	5	10	-	10
5	Femoral artery	2	-	5	5	-	10

**MONITORING**

S. No	Procedure	1 <sup>st</sup> year		2 <sup>nd</sup> year		3 year	
		Assist	Perform	Assist	Perform	Assist	Perform
1	Precordial stethoscope	-	50	-	50	-	50
2	Non invasive blood pressure	-	20	-	200	-	200
3	Central venous pressure	5	20	-	50	-	50
4	Pulmonary capillary wedge pressure	5	-	5	-	5	-
5	Intra Cranial pressure lateral ventricle	-	-	2	-	2	-
6	Electrocardiogram	5	10	-	20	-	50
7	Neuromuscular monitor	2	5	-	10	-	20
8	Capnography	5	50	-	100	-	100
9	Pulse oxymetry	5	100	-	200	-	200
10	Temperature monitoring	2	10	-	10	-	50

**CARDIO PULMONARY BRAIN RESUSCITATION TRAINING ON MANNEQUIN**

S. No	Procedure	1 <sup>st</sup> year		2 <sup>nd</sup> year		3 year	
		Assist	Perfor m	Assist	Perfor m	Assist	Perfor m
1	BLS	10	20	-	50	-	50
2	External cardiac massage	10	20	-	50	-	50
3	Use of manual bag mask resuscitation	5	20	-	100	-	50
4	Defibrillation	5	20	-	50	-	50
5	Advanced life support	10	-	-	20	-	50

#### **4.MAINTENANCE OF LOG BOOK**

- a. Every Post Graduate student shall maintain a record of skills he/she has acquired during the three years training period certified by the various Head of departments where he/she has undergone training including outside the institution.
- b. The student should also participate in the teaching and training programs of Under Graduate students of Medical, Dental and Other paramedical courses, both in Theory and Practicals from the first year onwards of the Post Graduate Degree course.
- c. In addition the Head of the department should involve their post graduate students in Seminars, Journal clubs, group discussions and participation in workshops, CME programs national and international conferences organized by the Department, Institution and outside the institution in the state and outside the state.
- d. Every Post Graduate student should be encouraged to present short title papers in conferences and improve on it and submit them for publication in indexed journals. Motivation by the Head of the Department is essential in this area to sharpen the skills of the Post Graduate Students.
- e. The Head of the Department should scrutinize the log book every three months and certify the work done.
- f. At the end of the course the student should summarise the contents and get the log book certified by the Head of the Department and submit the log book at the time of the University Practical Examination for the scrutiny of the board of examiners.

**4.1** It is preferable that a post graduate student during the course to present one poster presentation and /or to read one paper at a national /state conference and /or to present one research paper which can be published/accepted for publication/sent for publication during the period of his/her postgraduate studies.

## **5.THESIS**

Every student registered as post graduate shall carry out work on an assigned research project under the guidance of a recognized post graduate teacher, the result of which shall be written up and submitted in the form of a thesis.

Work for writing the Thesis is aimed at contributing to the development of a spirit of enquiry, besides exposing the student to the techniques of research, critical analysis, acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature. Thesis shall be submitted at least six months before the theoretical and clinical / practical examination.

The thesis shall be a bound volume of a minimum of 50 pages and not exceeding 75 pages of typed matter (Double line spacing and on one side only) excluding certification, acknowledgements, annexure and bibliography.

Thesis should consist of

- (a) Introduction
- (b) Review literature
- (c) Aims and objectives
- (d) Material and methods
- (e) Result
- (f) Discussion
- (g) Summary and conclusion
- (h) Tables
- (i) Annexure
- (j) Bibliography

Four copies of thesis shall be submitted six months prior to the commencement of the theory examinations on the date prescribed by the Controller of Examinations of this University. The thesis should be approved by the Professor of that branch and the same has to be forwarded to the Controller of Examinations, by the head of the department through the Dean of the college.

Two copies in addition are to be submitted as an electronic version of the entire thesis in a standard C.D. format by mentioning the details and technicalities used in the C.D. format.

The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and clinical; and on the acceptance of the thesis by two examiners, the student shall be allowed to appear for the final examination.

**EVALUATION OF THESIS :**

**ACCEPTED / NOT ACCEPTED**

No marks will be given

**6.SCHEME OF EXAMINATION**

**Post graduate Degree Course In MD Anaesthesiology BranchXIV**

**Scheme of Examination Theory (At the end of Third year)**

<b><u>Theory</u></b>	<b><u>Title</u></b>	<b><u>Duration in hours</u></b>	<b><u>Maximum marks</u></b>
Paper I	Basic sciences related to anaesthesiology	3h	100
Paper II	Clinical anaesthesiology	3h	100
Paper III	Clinical anaesthesiology related to specialties	3h	100
Paper IV	Anaesthesiology including critical care, pain and recent advances in anaesthesiology	3h	100`
<b>TOTAL</b>			<b>400</b>



<u>Practical/Clinical Examination</u>	<u>Title</u>	<u>Duration</u>	<u>Maximum Marks</u>
1	Long case 1	45 min	80
2	Short cases 2	15min(each)	120 ( 60 marks each)
<b>Total Marks</b>			<b>200</b>

<u>Viva voce Examination</u>	<u>Title</u>	<u>Duration</u>	<u>Maximum Marks</u>
Table1	X-ray ECG ABG PFT 1 Each or Any 2 Orals	10 min	25
Table 2	Anesthesia machine Circuits Flow volume loops Orals	10 min	25
Table 3	Instruments and drugs with importance on evolution of Anaesthesia Instruments & Drugs in routine use Orals	10 min	25
Table 4	BLS / ACLS	10 min	25
<b>Total Marks</b>			<b>100</b>

**Total practical / clinical: 300**

## MARKS QUALIFYING FOR A PASS

MARKS QUALIFYING FOR A PASS	MAXIMUM MARKS	QUALIFYING FOR A PASS 50% MARKS
Theory Examination	400	200
Practical Including clinical and Viva voce examination	300	150

A student shall secure not less than 50% marks in each head of passing which shall include 1. Theory, 2. Practical including and viva voce examination.

The postgraduate medical students are required to pass theory and practical examination separately. An examinee should obtain minimum 40 % marks in each theory paper and not less than 50 % marks cumulatively in all the four papers for Degree examination to be cleared as “passed” at the said degree examination”

As per Medical Council of India notification date 03.09.2014 and the same approved in the 28<sup>th</sup> academic council meet of SRM University held on 23.03.2015.

### **7. Examination and Evaluation**

#### **(1) EXAMINERS**

(a) All the post graduate Examiners shall be recognized post Graduation Teachers holding recognized Post Graduate Qualifications in the subject concerned.

(b) For all Post Graduate Examinations, the minimum number of Examiners shall be four, out of which at least two (50%) shall be external examiners, who shall be invited from other recognized universities from outside the state and other two will be internal examiners for M.D.

(c) Under exceptional circumstance, examinations may be held with 3 (three) examiners provided two of them are external and medical Council of India is intimated the justification of such action prior to publication of result for approval. Under no circumstances, result shall be published in such cases without the approval of Medical Council of India.

(d) The guidelines regarding appointment of examiner are the follows:-

1. No person shall be appointed as an examiner in any subject unless he/she fulfils the minimum requirements for recognition as a Post Graduate teacher as laid down by the Medical Council of India and has teaching experience of 8 (Eight) years as a Lecturer / Assistant Professor out of which he has not less than 5 (Five) years teaching experience after obtaining, Post Graduate degree. For external examiners, he should have minimum three years experience of examinership for Post Graduate diploma in the concerned subject. Out of internal examiners, one examiner shall be a Professor and Head of Department or Professor.

2. There shall be at least four examiners in each subject at an examination out of which at least 50% (Fifty percent) shall be external examiners. The external examiner who fulfils the condition laid down in clause - I above shall ordinarily be invited from another recognized university, from outside the State provided that in exceptional circumstances examinations may be held with 3 (three) examiners if two of them are external and Medical council of India is intimated with the justification of such examination and the result shall be published in such a case with the approval of Medical council of India.

3. An external examiner may be ordinarily been appointed for not more than three years consecutively. Thereafter he may be reappointed after an interval of two years.

4. The internal examiner in a subject shall not accept external examinership for a college from which external examiner is appointed in his subject.

5. The same set of examiners shall ordinarily be responsible for the written, practical or part of examination.

6. There shall be a Chairman of the Board of paper - setters who shall be an external examiner and shall moderate the question papers.

7. The Head of the Department of the institution concerned shall ordinarily be one of the internal examiners and second internal examiner shall rotate after every two year.

## **(2) Number of candidates**

The maximum number of candidates to be examined in Clinical /practical and Oral on any day shall not exceed six for M.D degree examination.

### **(3) Number of examinations**

The university shall conduct not more than two examinations in a year, for any subject with an interval of not less than 4 and not more than 6 months between the two examinations.

### **(4) Doctor of Medicine (M.D.) Anaesthesiology**

M.D. examination shall consist of Thesis, Theory Papers, and clinical / practical and Oral examinations.

#### **(a) Thesis**

The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical; and on the acceptance of the thesis by two examiners; the candidate shall appear for the final examination.

#### **(b) Theory**

- (i)** There shall be four theory papers.
- (ii)** Out of these one shall be of Basis Medical Science and one shall be Recent advances.
- (iii)** The theory examinations shall be held sufficiently earlier than the Clinical and Practical examination, so that the answer book can be assessed and evaluated before the start of the Clinical / Practical and Oral examination

#### **(c) Clinical / Practical and Oral**

- (i)** Clinical examination for the subject in Clinical Sciences shall be conducted to test the knowledge and competence of the candidates for undertaking, independent work as a specialist/Teacher, for which candidates shall examine a minimum one long case and two short cases.
- (ii)** The Oral examination shall be thorough and shall aim at assessing the candidate knowledge and competence about the subject, investigative procedures, therapeutic technique and other aspects of the speciality, which form a part of the examination.

A candidate shall secure not less than 50% marks in each head of passing which shall include (1) Theory, (2) Practical including clinical and viva voce examination.

### **Evaluation of Answer Scripts**

The answer books will be valued by two examiners. One of the two examiner will be from this university and the other will be from any other university. The Average of the two marks secured by the candidate will be taken into account. If the difference between two marks exceeds 20%, the answer scripts shall be valued by the third examiner. The average of the nearest two marks shall be considered as the final mark.

## **8. MODEL QUESTION PAPERS**

SRM University MD Anaesthesiology Final Examination

Basic science related to anaesthesiology -Paper - I

Answer all the questions

**Time: 3 hours**

**Maximum Marks: 100**

Answer all questions

### **I) Essay questions**

**2x20=40**

1. Make a simple drawing, with labels to show the trachea, main and segmental bronchi. Discuss the lung volumes and capacities
2. Describe in detail the various muscle relaxants used in anesthesia and enumerate the causes of inadequate reversal of muscle relaxants

### **II) Write short notes on**

**10x6=60**

1. Ivan Magill
2. A patient on the intensive care unit has a mean arterial pressure of 130 mmHg. What drugs might be useful for reducing this to a safe level and what is the mechanism of action of each?
3. Jackson Rees circuit
4. Supraglottic airway devices
5. List the factors associated with central venous catheter infections and suggest methods to limit such infections.
6. What are the physical principles of the capnograph? Discuss the applications of capnography?
7. Analysis of Variance
8. Venturi principle
9. Mallampatti classification
10. What are the advantages and disadvantages of nitrous oxide in clinical practice?

SRM University MD Anaesthesiology Final Examination

Clinical anaesthesiology -Paper -II

Answer all the questions

**Time: 3 hours**

**Maximum Marks: 100**

Answer all questions

**I) Essay questions**

**2x20=40**

1. List the pathophysiological and clinical features of HELLP syndrome. What are the diagnostic laboratory findings and management?
2. Define shock. Classify shock briefly explain the management. What are the causes and management of circulatory collapse at induction of anaesthesia?

**II) Write short notes on**

**10x6=60**

1. Outline the clinical features and management of bupivacaine toxicity
2. Describe the procedure, indications and complications of axillary nerve block
3. Explain airway anaesthesia for awake fiberoptic intubation
4. Complications during Laparoscopic surgeries
5. What are the anesthetic problems caused by morbid obesity?
6. Complications of anaesthesia with a patient in the prone position?
7. Diabetic ketoacidosis
8. Malignant hyperthermia
9. Oxygen toxicity
10. Massive blood transfusion

SRM University MD Anaesthesiology Final Examination

Clinical anesthesiology related to specialities-Paper- III

Answer all the questions

**Time: 3 hours**

**Maximum Marks: 100**

Answer all questions

**I) Essay questions**

**2x20=40**

1. Explain with diagram the structure and function of Laryngeal mask airway(LMA). Classify the types of LMA available for use. List out the indications and contraindications. Describe briefly the procedure of anaesthetizing a patient using LMA.
2. Define preoperative preparation and management of phaeochromocytoma

**II) Write short notes on**

**10x6=60**

1. Humidifiers
2. Glasgow coma scale
3. Myocardial protection during open heart surgery
4. Deep Vein Thrombosis (DVT) prophylaxis
5. Levobupivacaine
6. Fasting guidelines for adults and children
7. How is ventilator-associated pneumonia (VAP) diagnosed? Explain the physical, positional and pharmacological strategies that have been advocated for its prevention?
8. Preoperative preparation of thyrotoxic patients
9. Supine hypotension syndrome
10. Dead space



SRM University MD Anaesthesiology Final Examination

Anaesthesiology including critical care, pain & recent advances in  
Anaesthesiology IV

Answer all the questions

**Time: 3 hours**

**Maximum Marks: 100**

Answer all questions

**I) Essay questions**

**2x20=40**

1. What aims and strategies are emphasised in a "Pain Management Programme"? Describe briefly the newer pharmacological agents used for treatment of acute and chronic pain
2. What forms of ventilatory support are used for patients undergoing mechanical ventilation? Describe the criteria and methods to wean such patients from mechanical support.

**II) Write short notes on**

**10x6=60**

1. Novo VII
2. Dexmedetomidine
3. Trans esophageal echo cardiography
4. Explain target controlled infusion
5. Video laryngoscopes
6. Thromboelastography
7. Dynamic indices for assessing fluid challenge
8. Airway pressure release ventilation- APRV
9. Survival sepsis campaign
10. Hypertonic saline

## **Recommended books and journals**

### List of Books

#### Must read:

1. Lee's Synopsis of Anaesthesia - Davies. 13<sup>th</sup> Edition Elsevier, 2006.
2. Clinical Anesthesiology - Morgan. 5<sup>th</sup> Edition Churchill Livingston, 2013.
3. Anaesthesia - Rowbotham and Smith. 5<sup>th</sup> Edition Churchill Livingston, 2007.
4. Cardiac Anaesthesia - Joel Kaplan. 6<sup>th</sup> Edition Saunders, 2011.
5. Clinical Anaesthesia - Barash, Cullen and Stoelting. 7<sup>th</sup> Edition Lippincott, 2013.
6. Textbook of Anaesthesia - Aitkenhead Rowbotham and Smith. 6<sup>th</sup> Edition Churchill Livingston, 2013.
7. Paediatric Anaesthesia - Gregory. 4<sup>th</sup> Edition Churchill Livingston, 2002.
8. Pharmacology and Physiology for Anaesthetists - Stoelting. 5<sup>th</sup> Edition Lippincott, 2015.
9. Principles of Obstetric Anaesthesia - Holdcroft. Black Well, 2000.
10. Miller Anesthesia - Ronald Miller. 2volume 7<sup>th</sup> Edition Churchill Livingston, 2010.
- 11., Basics of Anaesthesia - Stoelting RK, Miller Rd, eds 5<sup>th</sup> Edition Churchill Livingston, 2010.
12. ICU Book - Paul Marino. 4<sup>th</sup> Edition Lippincott, 2013.
13. Critically ill, Schoemaker. Saunders, 2002.
14. Bonica Management of Pain - Scott Fishman. Lippincott, 2010.
15. Practical Management of Pain, Raj - Honorio Benzon. 5<sup>th</sup> Edition Mosby, 2013.
16. Stoelting & Dierdorf: Anaesthesia and Co-existing Disease - 6<sup>th</sup> Edition Elsevier, 2012

17. Dorsch and Dorsch: Understanding Anaesthesia Equipments. 5<sup>th</sup> Edition Lippincott, 2008.
18. ECG - Shamroth and Goldman. 7<sup>th</sup> Edition Black Well, 2007.
19. Anatomy for Anaesthetists - Harold Ellis. 9<sup>th</sup> Edition John Wiley, 2013.

**Must refer:**

1. Cucchiara and Michenfelder: Clinical Neuroanaesthesia. 2<sup>nd</sup> Edition Churchill Livingstone, 1998.
2. Cottrell & Smith: Anaesthesia and Neurosurgery. Mosby, 2001.
3. Smith: Pediatric Anesthesia. 8<sup>th</sup> Edition Elsevier, 2011.
4. Complications in Anaesthesia - John Atlee. 2<sup>nd</sup> Edition, Saunders publication, 2007.
5. Airway management - JL Benumof. 2<sup>nd</sup> Edition Mosby, 2007.
6. Obstetric Anaesthesia - Chestnut. 4<sup>th</sup> Edition Mosby, 2009.

### **List of Journals:**

1. Indian Journal of Anaesthesia
2. Journal of Anaesthesiology and Clinical Pharmacology
3. Anaesthesia
4. British Journal of Anaesthesia
5. Anesthesia and Analgesia
6. Anesthesiology
7. Anaesthesia and Intensive Care
8. Canadian Anaesthesia Society Journal
9. Acta Anaesthesia Scandinavia
10. Regional Anesthesia and Pain Medicine

### **Year Books:**

1. Anesthesia Clinic of North America
2. International Anesthesiology Clinics
3. Year Book of Anaesthesia
4. Recent Advances in Anaesthesia
5. Anaesthesia Review

**“ No thief , however skillful, can’t rob one of knowledge, and that is why knowledge is the best and safest treasure to acquire”**

**- L. Frank Baum**