



**AMRITA**  
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# **PROGRAM**

# **MD ANAESTHESIOLOGY**

(Revised with effect from 2016-2017 onwards)

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## **PROGRAM OUTCOMES**

PO1: Competence to practice independently the art and science of Anaesthesiology

and Resuscitation effectively and ethically, backed by scientific knowledge and skill base.

PO2: The competence to undertake responsibilities in critical care unit, trauma unit, and respiratory therapy unit of unconscious patients requiring ventilatory support.

PO3: The competence to undertake acute and chronic pain management.

PO4: Attitude to continue professional development irrespective of whether he is in a teaching institution or in private anaesthetic practice.

PO5: The ability to be a dedicated, motivated teacher who is always keen to train or to share his knowledge and skills with a colleague or junior or any learner.

### **Program Specific Outcomes:**

PSO1: Knowledge of the anaesthetic management of common and uncommon surgical ailments belonging to various branches of surgery, at all ages requiring operative interventions with a basic knowledge of the aetiology, Pathophysiology and the surgical treatment of the conditions

PSO2: Ability to perform 'Pre-Anaesthetic Evaluation' of patients undergoing surgery by taking proper clinical history, examining the patients, ordering relevant investigations and interpreting them to have additional information about the surgical condition and the associated medical condition which warrant the modification of the proposed anaesthetic management

PSO3: Competence to administer anaesthesia (general and or regional) to common surgical operations independently and to super specialisations like cardiac surgery, neurosurgery etc with the help of a senior anaesthesiologist

PSO4: Knowledge of the underlying theoretical background of mechanism pain perception and pain management

PSO5: Knowledge of the theory of underlying aetiology, mechanism and management of the conditions requiring resuscitation

PSO6: Manage airway and perform ventilatory care etc. of unconscious and polytrauma cases by a member of trauma team and critical care unit team

PSO7: Competence to advise regarding the anaesthetic management of any surgical case and to carry on this management effectively

PSO8: Undertake complete patient monitoring including preoperative ventilatory care of the patients

PSO9: Perform acute and chronic pain management

PSO10: Knowledge regarding the medicolegal aspects of anaesthesia

PSO11 Undertake audit, use information technology tools and carryout research, both basic and clinical with the aim of publishing the work and presenting the same at various scientific for a

PSO12: Respect patient's rights and privileges including right to information and right to seek a second opinion

### **Goals:**

The goals of three year degree course in Anaesthesiology would be to train a MBBS doctor who after the satisfactory completion of which shall:

1. Practice independently the art and science of Anaesthesiology and Resuscitation effectively and ethically, backed by scientific knowledge and skill base.
2. Undertake responsibilities in critical care unit, trauma unit, and respiratory therapy unit of unconscious patients requiring ventilatory support.
3. Undertake acute and chronic pain management.
4. Continue to evince keen interest in continuous professional development irrespective of whether he is in a teaching institution or in private anaesthetic practice.
5. Be a dedicated, motivated teacher who is always keen to train or to share his knowledge and skills with a colleague or junior or any learner.

### **Objectives:**

The following objectives are laid out to achieve the goals of the course. These objectives have to be achieved by the candidates by the time of completion of the course. The objectives may be considered under the following headings.

1. Knowledge (cognitive domain)
2. Skills (Psychomotor domain)
3. Attitudes communication skills, human values and ethical practice

At the end of the training the candidate must be able to:

### **Knowledge:**

- Demonstrate understanding of basic sciences relevant to anaesthesia
- Describe the anaesthetic management of common and uncommon surgical ailments belonging to various branches of surgery, at all ages requiring operative interventions with a basic knowledge of the aetiology, Pathophysiology and the surgical treatment of the conditions

- Describe the underlying theoretical background of mechanism pain perception and pain management
- Describe the theory of underlying aetiology, mechanism and management of the conditions requiring resuscitation
- Recognise the conditions that may be outside the areas of his competence and refer them to an appropriate specialist prior to anaesthetising them
- Advise regarding the anaesthetic management of any surgical case and to carry on this management effectively
- Update himself/herself by self-study and by attending courses, conferences and seminars relevant to anaesthesia
- Teach and guide his team colleagues and students
- Demonstrate understanding of medicolegal aspects of anaesthesia
- Undertake audit, use information technology tools and carryout research, both basic and clinical with the aim of publishing the work and presenting the same at various scientific fora

### **Skills:**

- Perform 'Pre-Anaesthetic Evaluation' of patients undergoing surgery by taking proper clinical history, examining the patients, ordering relevant investigations and interpreting them to have additional information about the surgical condition and the associated medical condition which warrant the modification of the proposed anaesthetic management
- Administer anaesthesia (general and or regional) to common surgical operations independently and to super specialisations like cardiac surgery, neurosurgery etc with the help of a senior anaesthesiologist
- Provide Basic Life Support (BLS) and Advanced Cardiac Life Support (ACLS)
- Manage airway and perform ventilatory care etc. of unconscious and polytrauma cases by a member of trauma team and critical care unit team
- Undertake complete patient monitoring including preoperative ventilatory care of the patients
- Perform acute and chronic pain management

### **Attitudes and communication abilities:**

- Adopt ethical principles in all aspects of his anaesthetic practice. Professional honesty and integrity are to be fostered. Anaesthesia care is to be delivered to all in need, irrespective of the social status, caste, creed or religion of the patient

- Develop communication skills, in particular the skill to explain the various options available in the anaesthetic management, critical care, pain management and to obtain a true informed consent from the patient
- Provide leadership in the operating room environment and get best out of the team in a congenial working atmosphere
- Apply high moral and ethical standards while carrying out human or animal research
- Be humble and accept the limitations in his knowledge and skill and to ask for help from colleagues when needed
- Respect patient's rights and privileges including right to information and right to seek a second opinion

### **Course Contents:**

It includes topics not only of Anaesthesiology but also those aspects of all the other branches of medicine relevant to Anaesthesia viz. Medicine and its allied subjects, surgery and its allied branches, Pediatrics, applied anatomy, physiology, pathology, pharmacology, microbiology etc. It is intended as a guide to the candidates and it is not comprehensive. As and when there is newer development, it becomes eligible for inclusion. Hence, the candidates should be familiar themselves with the current content of the scientific journals and reviews of major topics, in Anaesthesia.

1. History of anaesthesiology
2. Basic sciences related to anaesthesia including Anatomy, Physiology, Pharmacology, Biochemistry, Pathophysiology, Immunology and Genetics
3. Medicine applied to Anaesthesiology
4. Physics related to Anaesthesiology, Electronics, Computers and Lasers, in Anaesthesiology, Internet/Medicine and its uses and applications
5. Anaesthesiology
  - i. Pre anaesthetic evaluation and preparation
  - ii. Principles and practice of Anaesthesiology including pre per and post operative care, of patients belonging to General Surgery and other sub specialties like Cardiothoracic Surgery, Neurosurgery, Orthopaedics, Plastic Surgery and Surgical Endocrinology, Surgical Oncology, Paediatrics, Obstetrics and Gynaecology, ENT, Ophthalmology, Urology, Dental Surgery, Laproscopy Surgery, transplant etc..
  - iii. Blood transfusion- Fluid and Electrolyte balance- Acid Base Balance
  - iv. Fires and Explosion in operation theatre
  - v. Operation theatre sterilization procedures

6. Pain clinic organization and management, Pain pathway and management of pain
7. Respiratory therapy and management of both acute and chronic respiratory insufficiencies and ventilator commitments in ICU
8. Critical Care Anaesthesiology and Trauma Care Unit management
  - Different methods of anaesthetic techniques
  - Regional anaesthesia including spinal, epidural and caudal etc
  - Local anaesthesia including nerve blocks
  - Anaesthesia in abnormal environments like high altitude anaesthesia etc
  - Anaesthesia for day care surgery
  - Anaesthesia for diagnostic procedure like endoscopy CT scan, MRI etc..
  - Diagnosis of brain death
  - Physiological support of the organ donor
  - Acute care of trauma victims
  - Management of severe head injury and spinal injury
  - Management of patients in sepsis
  - Management raised ICP
9. Informed consent/medicolegal issues: understanding the implications of acts of omission and commission in practice. Issues regarding consumer protection implications in medicolegal cases
10. Communications skills with colleagues teachers, patients, and patients relatives
11. Principles of Anaesthesia audit understanding the audit process and outcome; methods adopted for the same
12. Essentials of Research methodology:
  - i. Basics of Biostatistics and its application
  - ii. Ability to undertake clinical and basic research
13. Principles of Evidence Based Medicine and its application in anaesthetic practice
14. Medical Ethics/social responsibilities of the anaesthesiologists
15. Record keeping: Ability to keep records as scientifically as possible; knowledge of computers is beneficial

## **TECHNICAL SKILLS TO BE ACQUIRED**

The list within the tables indicates the procedures that the student should by the end of the course, be able to perform independently (PI) by himself/herself, should have performed with assistance (PA) should have observed (O) or assisted (A) during the course. NA – Not applicable

Skills may be considered under the following headings:

1. Basic graduate skills
2. Anaesthesia procedures
3. Critical care procedures
4. Emergency room procedures
5. Pain alleviation procedures

**a) Basic graduate skills:**

The students should have acquired the certain skills during his undergraduation and internship. There skills have to be reinforced at the beginning of the training period. There include:

Procedure	Category	Year	No.
Insertion of IV lines	PI	1	100
Insertion of Nasogastric tubes	PI	1	100
Recording of vital signs	PI	1	100

**b) Anaesthesia procedures:**

Orotracheal intubation	PI	I/II/III	100
Nasotracheal intubation	PI	I/II/III	50
LMA insertion	PI	I/II/III	50
Airway (Oral/Nasal)insertion	PI	I/II/III	100
Subarachnoid block	PI	I/II/III	100
Epidural block (including caudal)	PI	I/II/III	10
Brachial plexus block	PI	II/III	5
Intravenous Regional Anaesthesia	PI	II/III	5
Three in one block	PI	II/III	2
Rectus Sheath Block	PI	II/III	2
Hernia block	PI	II/III	2
Other nerve blocks	PI	II/III	NA
Major anaesthesia procedures	PI	II/III (Per year)	100
Minor anaesthesia	PA/PI	II/III	200



procedures		(per year)	
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**c) Critical Care Procedures:**

Insertion of Arterial lines	PI	II/III	5
Insertion of Central Venous Lines	PI	II/III	5
Intercostal drainage	O	II/III	NA
Tracheostomy	O	III	NA
Ventilatory Management of Patients	PI	II/III	NA
Sampling for & Interpretation of ABG	PI	II/III	NA
Correction of Electrolyte imbalance	PI	II/III	NA
Fibreoptic Bronchoscopy	PA	III	NA
Minitracheostomy	PA	III	NA
Insertion of SWG & PA catheter	O	III	NA

**d) Emergency Room Procedures:**

Cardiopulmonary Resuscitation (BLS & ACLS)	PI	I/II/III	NA
Management of Cardiac failure	PI	II/III	2
Management of Respiratory failure	PI	II/III	2
Management of shock	PI	II/III	2
Management of airway obstruction	PI	I/II/III	5

**e) Pain Alleviation Procedures:**

Stellate ganglion block	PA	III	2
Coeline ganglion block	PA	III	2
Trigeminal Nerve block	PA	III	2
Labour analgesia	PI	II/III	

Post operative pain management	PI	II/III	100
Neurolysis & Other nerveablation procedures	PA	III	2
TENS	PI	II/III	2

### **Teaching and learning activities**

A candidate pursuing the course should work in the institution as a full time student. No candidate should be permitted to run a clinic/laboratory/nursing home while studying post graduate course. Each year should be taken as a unit for the purpose of calculating attendance.

Every student shall attend teaching and learning activities during each year as prescribed by the department and not absent himself/herself from work without valid reasons.

A list of teaching and learning activities designed to facilitate students acquire essential knowledge and skills outlined is given below.

**1. Lectures :** Lectures are to be kept to a minimum. They may, however, be employed for teaching certain topics. Lectures may be didactic or integrated.

a) Diabetic lectures : Recommended for selected common topics for post graduate students of all specialties. Few topics are suggested as examples:

1. Bio-statistics
2. Use of library
3. Research Methods
4. Medical code of conduct and medical ethics
5. National health and disease control programs
6. Communication skills etc
7. Initial introductory lectures about the subject

These topics may preferably taken up in the first few weeks of the 1<sup>st</sup> year.

b) Integrated lectures : These are recommended to be taken by multidisciplinary teams for selected topics, eg. Diabetes Mellitus, Thyroid etc.

- 2. Journal club** : Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion and enter in the log book relevant details. Further, every candidate must make a presentation from the allotted journal(s) of selected articles at least four times a year and a total of 12 presentations in three years. The presentations would be evaluated using checklists and would carry weightage for internal assessment (see checklist in Chapter IV). A time table with names of the students and the moderator should be announced at the beginning of every year.
- 3. Subject seminar** : Recommended to be held once a week. All the PG students are expected to attend and actively participate in discussion and enter in the logbook relevant details. Further, every candidate must present on selected topics at least four times a year and total of 12 seminar in three years. The presentations would be evaluated using checklists and would carry weightage for internal assessment (see checklist in Chapter IV). A timetable for the subject with names of the student and the moderator should be scheduled at the beginning of every year.
- 4. Student symposium** : Recommended as an optional multi disciplinary programme. The evaluation may be similar to that described for subject seminar.
- 5. Ward rounds** : May be service rounds or teaching rounds.
  - a) Service rounds : Post graduate students should do ward rounds every day
    1. For anaesthetic evaluation of the patients posted for operation
    2. And to do the post anaesthetic follow up of operated patients for alleviation of post operative pain and for diagnosis and management if any of the post operative sequelae
  - b) Teaching rounds : Every unit should have grand round for teaching clinical methods and pre anaesthetic evaluation  
Entries of (a) and (b) should be made in the log book
  - c) ICU rounds : Everyday ICU rounds with senior consultant regarding progress and plan for patient which should include in the teaching programme.
- 6. Mortality and morbidity meetings** : Recommended once a month for all postgraduate students. Presentation is done by rotation and by the students who had conducted/assisted anaesthetic management.
- 7. Inter departmental meetings** : strongly recommended particularly with departments of surgery and medicine at least once a month. These meetings

should be attended by post graduate students and relevant entries must be made in the logbook.

- 8. Teaching skills :** Post graduate students must teach undergraduate students (eg. Medical, Nursing) by taking demonstrations, bed side clinics, tutorials, lectures etc. Assessment is made using a checklist by faculty. Record of their participation should be kept in log book. Training of post graduate students in educational technology is recommended.
- 9. Continuing medical education programmes (CME) :** At least 2 state/national level CME programmes should be attended by each student in 3 years.
- 10. Conferences :** Attending conferences is optional. However participation and presentation of scientific paper should be encouraged.

### **Dissertation :**

Every candidate pursuing MD degree course in Anaesthesiology is required to carry out work on a selected project under the guidance of recognized post graduate teacher. The results of such a work shall be submitted in the form of dissertation.

1. The dissertation is aimed to train a post graduate student in research methods and techniques. It includes identification of a problem, formulation of a hypothesis, searching about review of literature, getting acquainted with recent advances, designing of a research study, collection of data, critical analysis, comparison of results and drawing conclusions.
2. Every candidate shall submit to University in the prescribed proforma, a synopsis containing particulars of proposed dissertation work within 4 months from the date of commencement of the course on or before the dates notified by the University. The synopsis shall be sent through the proper channel.
3. Such synopsis will be reviewed and the dissertation topic will be registered by the university. No changes in the dissertation topic or guide shall be made without prior approval of the university.
4. The dissertation should be written under the following headings:
  - a. Introduction
  - b. Aims or Objectives of the study
  - c. Review of Literature
  - d. Material and methods
  - e. Results
  - f. Discussion
  - g. Conclusion
  - h. Summary
  - i. References

- j. Tables
  - k. Annexure
5. The written text of dissertation shall be not less than 50 pages and shall not exceed 150 pages excluding references, tables, questionnaires and other checklists. It should be neatly typed in double line in double line spacing on one side of paper (A4 size, 8.27" x 11.69") and bound properly. Spiral binding should be avoided. The dissertation shall be certified by the guide, head of the department and head of the institution.
  6. Four copies of dissertation thus prepared shall be submitted to the University, 6 months before final examination on or before the dates notified by the University.
  7. The dissertation shall be valued by examiners appointed by the University. Approval of dissertation work is an essential precondition for a candidate to appear in the university examination
  8. Guide : The academic qualification and teaching experience required for recognition by this University as a guide for dissertation work shall be as per Medical Council of India Minimum qualifications for Teachers in Medical institutions regulations 1998. Teachers in medical college/institution having a total of eight years teaching experience out of which at least 5 years teaching experience as lecturer or assistant professor gained after obtaining post graduate degree, shall be recognized as post graduate teachers.  
**A co-guide** may be included provided the work requires substantial contribution from a sister department or from another medical institution recognized for teaching/training by the University/Medical Council of India. The co-guide shall be a recognized post graduate teacher.
  9. Change of guide : In the event of a registered guide leaving the college for any reason or in the event of death of guide, guide may be changed with prior permission from the university.
  10. For some more details regarding guide etc. please see chapter 1 and for books on research methodology, ethics, etc, see Chapter IV.

### **Rotation and posting in other departments**

The listed knowledge and skills are to be learnt over a period of 3 years. The process is a continuous one. However the recommended period and timing of training in basic sciences, allied departments and specialty departments are given below. The total duration of postings in allied and sub specialties will be 8 months and the remaining 2 years and 4 months in mother department.

**Basic sciences:**

Rotation in these departments viz. Anatomy, Physiology, Pharmacology etc are to be done as concurrent studies during the 1<sup>st</sup> year of training, at least 6two hours may be spent in the first six months of the course. Basic sciences relevant to Anaesthesia can be studied in the respective departments in the afternoons.

**Anatomy :**

Special emphasis for the dissection of larynx, heart, various nerves and plexus.

**Physiology :**

Thorough revision of all the system, in particular Cardio Vascular System, and Respiratory system.

**Pharmacology :**

Of drugs used in Anaesthesia and drugs used for management of systemic disease and drug interactions

**Allied Speciality:**

Students should be posted ICU, ICCU, SICU ( Trauma unit) and pain clinic during 2<sup>nd</sup> year of training of 2 weeks in each, for total duration of 2 months.

**Other sub specialities of anaesthesia:**

Posting to other sub speciality departments will be during 2<sup>nd</sup> year and the duration of postings are as under :

Cardiothoracic surgery	:	6 weeks	}	32 weeks
Neurosurgery	:	4 weeks		
Paediatric surgery	:	6 weeks		
Cancer surgery	:	4 weeks		
Oromaxillary surgery	:	2 weeks		
Plastic surgery	:	2 weeks		
Urology	:	4 weeks		
Laposcopic and Endoscopic surgery	:	2 weeks		
Anaesthesia for investigative procedure like CT scan, Lithotripsy, Cardiac cath lab:	:	2 weeks		

**Courses:**

**Paper 1 : Basic science as applicable to anaesthesia. (Code MDAN1)**

CO1: Knowledge of Anatomy, physiology and pharmacology necessary in the practice of anaesthesiology.

CO2: Understanding of the Physics involved in the function of equipment used in Anaesthesia.

CO3: Knowledge of biochemistry involved in anaesthesia.

CO4: Understanding the Patho Physiology of diseases which can increase risk during anaesthesia.

CO5: History of development of anaesthesia.

CO6: Competency in the use of the equipments used in anaesthesia.

**Anatomy :**

**Special emphasis for the dissection of larynx, heart, various nerves and plexus.**

**Physiology :**

Thorough revision of all the system, in particular Cardio Vascular System, and Respiratory system.

**Pharmacology :**

**Of drugs used in Anaesthesia and drugs used for management of systemic disease and drug interactions**

**Allied Speciality:**

Students should be posted ICU, ICCU, SICU ( Trauma unit) and pain clinic during 2<sup>nd</sup> year of training of 2 weeks in each, for total duration of 2 months.

**Paper II : Clinical Practice of Anaesthesia (MDAN2)**

CO1: Knowledge of cardio vascular system and respiratory system necessary in the practice of anaesthesiology.

CO2: Knowledge of Neuro surgery, Obstetrics and Gynaecology, Orthopaedics and Ophthalmology

**Pre anaesthetic evaluation and preparation**

**Principles and practice of Anaesthesiology including pre per and post operative care, of patients belonging to General Surgery and other sub specialties like Cardiothoracic Surgery, Neurosurgery, Orthopaedics, Plastic Surgery, Ophthalmology, Laproscopy Surgery, transplant etc..**

### **Paper III : Clinical practice of anesthesia (MDAN3)**

CO1: Knowledge of the specialties of paediatrics, geriatrics, ENT.

CO2: Knowledge of Renal & Hepatic system, Endocrines and Haemopoietic system.

CO3: Competency in Out patient anaesthesia & dental anaesthesia

CO4: Competency to administer Nerve Blocks

**Principles and practice of Anaesthesiology including pre per and post operative care, of patients belonging to Surgical Endocrinology, Surgical Oncology, Paediatrics, ENT, Ophthalmology, Urology, Dental Surgery, Laproscopy Surgery, transplant etc , and competency in performing nerve blocks**

**Competency in giving epidural analgesia in second stage of labour**

**Dental anesthesia**

**Anesthesia in pediatrics**

### **Paper IV : Applied medicine in relation to anaesthesia (MDAN4)**

CO1: Knowledge in the theoretical aspects of pain.

CO2: Competency in pain relief, in the post operative period.

CO3: Competency to manage cancer pain.

**Competency in Pain clinic organization and management, Pain pathway and management of pain mainly cancer pain and also during post operative period**

### **Soft Skills (MDAN5) – Elective Course**

CO1: The ability to practice the specialty in an ethical manner.

CO2: The ability to work as a member/leader of a healthcare team.

CO3: Teaching abilities.

CO4: Attitude to be a lifelong learner.



Values such as the adoption of ethical principles, professional honesty and integrity would be inculcated in the student during the training. These include, but is not limited to a) Communication skills with patients, caregivers and colleagues b) Attitude to be a lifelong learner c) Competency to be a good teacher & d) Ability to work as the member of a team. These will be assessed by 360 degree evaluation.

## **Year wise structured training schedule**

### **First year :**

1. Basic sciences related to Anaesthesiology, Theoretical knowledge, frequent visits to Anatomy dissection halls and Museum, Physiology Laboratories etc. to revise the relevant subjects.
2. Theoretical knowledge of Anaesthesiology & Resuscitation : Special emphasis on clinical examination of patients, learning clinical methods, arriving at correct diagnosis.
3. Basic knowledge about :
  - a. Computers in anesthesia, medicine, internet
  - b. Bio statistics
  - c. Medical audit
  - d. Medico legal aspects
  - e. Research Methodology
  - f. Evidence based medicine
  - g. Medical ethics, social responsibilities of anaesthesiologists
4. Learning of communications skills
5. Anaesthesia skills
  - a. Pre anaesthetic evaluation/under supervision
  - b. Monitoring of patients through out peri operative period
  - c. Management of Spinal Headache
  - d. Assisting setting up of Anaesthesia machine, Monitor & Ventilator
  - e. Assisting the conduct of anaesthesia for major surgeries, knowledge about the complications of anaesthesia
  - f. Assisting for short anaesthesia initially and later on doing independently under supervision
  - g. Conduct of anaesthesia OPD
  - h. Conduct of Pre Anesthesia Clinic
  - i. CPR training and mastering of BLS & ACLS
  - j. Anesthesia in Geriatric Age group

6. Dissertation : Choosing a topic of dissertation, submission of synopsis to the university, collection of literature, conduct of pilot studies.

### **Second year :**

1. Theoretical knowledge of allied subjects, sub specialities of anaesthesia, assisting senior anesthesiologists in specialised branches like paediatric surgery, cardiothoracic surgery, critical care trauma etc.
2. Anaesthetic skills : At the end of 2<sup>nd</sup> year the student should be capable of :
  - a. Anaesthetising patients without assistance but under supervision
  - b. Identifying the complication of anaesthesia and manage them independently but under supervision
  - c. Setting up of Anaesthesia machine, monitor and ventilator independently
3. Conference & workshops : Attending one state level and one national level conference/CME and presentation of a scientific paper.
4. Dissertation : Carrying out of the dissertation study work, periodic review, interaction with guide. Organization of the date writing up of the manuscript of dissertation at the end of 2<sup>nd</sup> year.
5. the student should be actively involved in presentation of seminars, journal clubs, case presentations/discussions.

### **Third year :**

1. The student should be well versed with basics, allied subjects and recent advances in the respective fields.
2. Anaesthesia skills – at the end of the 3<sup>rd</sup> year the candidate should be able to make independent decisions as regards anaesthesia pain management and post operative care of all kinds of patients.
3. Teaching activities – Final year student should take lead in conducting seminars, journal clubs, case discussions, panel discussions with 1 and ii year students. The third year students should also involve in teaching undergraduate students specially bed side clinics.
4. Dissertation : The completed dissertation must be submitted to the University, 6 months before the examination before the notified date.
5. The student must get expertise in the specialised procedures as noted in the course content table.

### **Monitoring Progress of studies**

It is essential to monitor the learning progress of each candidate through continuous appraisal and regular assessment. It not only helps teachers to evaluate students, but also students to evaluate themselves,. The monitoring be done by the staff of the department based on participation of students in various teaching/learning

activities. It may be structured and assessment be done using checklists that assess various aspects. Checklists are given in chapter IV.

The learning outcomes to be assessed should include:

1. Personal attitudes
2. Acquisition of knowledge
3. Clinical and operative skills and
4. Dissertation
5. Teaching skills

### **1. Personal attitudes:**

The essential items are:

- a. Caring attitudes
- b. Initiative
- c. Organisational ability
- d. Potential to cope with stressful situations and undertake responsibility
- e. Trustworthiness and reliability
- f. To understand and communicate intelligibly with patients and others
- g. To behave in a manner which establishes professional relationships with patients and colleagues
- h. Ability to work in team
- i. A critical enquiring approach to the acquisition of knowledge

The methods used mainly consist of observation. It is appreciated that these items require a degree of subjective assessment by the guide, supervisors and peers.

### **2. Acquisition of knowledge :**

The methods used comprise of "Log Book" which records participation in various teaching/learning activities by the students. The number of activities attended and the number in which presentations are made are to be recorded. The log book should periodically be validated by the supervisors. Some of the activities are listed. The list is not complete. Institutions may include additional activities, if so, desired.

*Journal review meeting (journal club)* : The ability to do literature search, in depth study, presentation skills, and use of audio-visual aids are to be assessed.

The assessment is made by faculty members and peers attending the meeting using checklist (see model checklist –1, Chapter IV)

*Seminars/Symposia:* The topics should be assigned to the student well in advance to facilitate in depth study. The ability to do literature search, in depth study, presentation skills and use of audio-visual aids to be assessed using a checklist (see model checklist – II, Chapter IV)

*Clinico-pathological conferences :* This should be a multidisciplinary case study of an interesting case to train the candidate to solve diagnostic and therapeutic problems by using an analytical approach. The presenters are to be assessed using a check list similar to that used for seminar.

### **3. Clinical skills :**

*Day to Day work :* Skills in outpatient and ward work, should be assessed periodically. The assessment should include the candidates sincerity and punctuality, analytical ability and communication skills (see Model checklist III, Chapter IV)

*Clinical meetings :* Candidates should periodically present cases to his peers and faculty members. This should be assessed using a check list (see model checklist IV, chapter IV)

*Clinical and procedural skills :* The candidate should be given graded responsibility to enable learning by apprenticeship. The performance is assessed by the guide by direct observation. Particulars are recorded by the student in the log book (Table no.3)

### **4. Teaching skills**

Candidates should be encouraged to teach undergraduate medical students and paramedical students, if any. This performance should be based on assessment by the faculty members of the department and from feedback from the undergraduate students (see model checklist V, chapter IV)

### **5. Dissertation in the Department**

Periodic presentations are to be made in the department. Initially, the topic selected is to be presented before submission to the University for registration, again before finalization for critical evaluation and another before final submission of the completed work (see model checklist VI & VII, chapter IV)

### **6. Work diary/log book**

Every candidate shall maintain a work diary and record his/her participation in the training programmes conducted by the department such as journal reviews, seminars etc. Special mention may be made of the presentations by the candidate as well as details of clinical or laboratory procedures, if any conducted by the candidate. The work diary shall be scrutinized and certified by the head of the department and head of the institution, and presented in the university practical/clinical examination.

## **7. Periodic tests**

The departments may conduct three tests, two of them be annual tests, one at the end of the first year and the other in the second year. The third test may be held three months before the final examination. The tests may include written papers, practicals/clinical and viva vice.

## **8. Records**

Records, log books and marks obtained in tests will be maintained by the Head of the Department and will be made available to the University or MCI.

## **Log Book**

The log book is a record of the important activities of the candidates during his training, internal assessment should be based on the evaluation of the log book. Collectively, log books are a tool for the evaluation of the training programme of the institution by external agencies. The record includes academic activities as well as the presentations and procedures carried out by the candidate.

Format for the log book for the different activities is given in tables 1, 2, and 3 of Chapter IV, copies may be made and used by the institutions.

### *Procedure for defaulters :*

Every department should have a committee to review such situations. The defaulting candidate is counseled by the guide and head of the department. In extreme cases of default the departmental committee may recommend that defaulting candidate be withheld from appearing the examination. If she/he fails to fulfill the requirements in spite of being given adequate chances to set himself or herself right.

## **Scheme of Examination**

- A) Written examination shall consist of four question papers each of three hours duration. Each paper shall consist of two long questions carrying 20 marks each

and 6 short essay questions each carrying 10 marks. Total marks for each paper will be 100. Questions on recent advances may be asked in any or all the papers. Distribution of topics for each paper will be as follows:

Paper 1 : Basic science as applicable to anaesthesia. (Code MDAN1)

- Anatomy
- Physiology
- Pharmacology
- Physics
- Biochemistry
- Patho Physiology
- History
- Equipments

Paper II : Clinical Practice of Anaesthesia (MDAN2)

- Cardio vascular system
- Respiratory system
- Neuro surgery
- Obstetrics and Gynaecology
- Orthopaedics
- Ophthalmology

Paper III : Clinical practice of anesthesia (MDAN3)

- Paediatrics
- Renal & Hepatic system
- Endocrines
- Haemopolitics
- Geriatrics
- ENT
- Out patient anaesthesia & dental anaesthesia
- Nerve Blocks

Paper IV : applied medicine in relation to anaesthesia (MDAN4)

Theoretical aspects of pain and pain relief including post operative and cancer pain

B) Clinical examinations : (200 marks)

It should aim at examining clinical skills and competence of candidates for undertaking independent work as a specialist. Each candidate should examine

and present atleast one long case (carrying 100 marks) and two short cases (each carrying 50 marks). The total marks for clinical examination shall be 200.

C) Viva Voce : (100 marks)

Viva voce examination shall aim at assessing depth of knowledge, logical reasoning, confidence and oral communication skills. The total marks shall be 100 and the distribution of marks shall be as under :

- i. For examination of all components of syllabus.....80 marks  
All examiners will conduct viva voce conjointly on candidates comprehension, analytical approach expression and interpretation of data. It includes all components of course contents. In addition the candidate may also be given, instruments/equipments, x-ray images, ABG reports, ECG strips, Drugs Ultrasound/Echocardiography reports and specimen. It includes discussion on dissertation also.
- ii. For teaching skills (Pedagogy).....20 marks  
A topic to be given to each candidate in the beginning of clinical examination. He/she is asked to make presentation on the topic for 8 to 10 minutes.

<b>Maximum marks for</b>	<b>Theory</b>	<b>Practical</b>	<b>Viva</b>	<b>Grand total</b>
MD Anaesthesiology	400	200	100	700

**Recommended Books & Journals**

1. Practice of Anaesthesiology – Wylie – Churchill-Davidson
2. General Anaesthesia – Gray, Nunn, Utting
3. International practice of anaesthesia 2 volumes – Prys-Roberts
4. Anaesthesia – two volumes, Ronald.D.Miller
5. Clinical Anesthesia- Barash, Cullen, Stoelting
6. Anatomy for Anaesthetist – Harold Willis
7. Essential anatomy for anesthesia – Black/Chambers
8. Understanding Anaesthetist equipments – Dorsh & Dorsh
9. Emergency anaesthesia – Thronton
10. Principles of Obstetric Anaesthesia – J.S.Crawford
11. Obstetric anaesthesia – Principles and practice – David H. Chestnut

12. Physics for anaesthetist – Mushin & Jones
13. Neuro surgical anaesthesia – Hunter
14. Anesthesia and Neurosurgery – Cottrell
15. Clinical neuro anesthesia - Cucchiara
16. Paediatric anaesthesia – Gregory
17. Cardiac Anaesthesia 2 volumes – Kaplan
18. Anaesthesia and co existing diseases – Stoelting
19. Anaesthesia equipment – Ehrenwerth and James.B.Eisonkraft
20. Text book of anaesthesia – Atkenhead, Rowbatham, Smith
21. Smith’s Anaesthesia for infants and children – Etsuro K Motoyama
22. Obstetrics anaesthesia and uncommon disorders – Gambling and Douglas
23. Textbook of pain – Wall/Melzack
24. Bonica’s management of pain
25. Textbook of regional anesthesia- Raj
26. Clinical anaesthesiology- Morgan
27. Anaesthesia for Orthopaedic surgery
28. Principles of Critical Care – Schmidt/Wood
29. Intensive Care Medicine – Irwin, Cerra, Rippe
30. The ICU book – Marino
31. Mechanical Ventilation – Macintyre/Branson
32. Neural blockade in Clinical Anesthesia and management of pain- Michael J Cousins
33. Thoracic anaesthesia – Jonathan L. Benumof
34. Drugs interactions and other basic medical science and anaesthesia speciality books as available

### **Journals**

1. Anaesthesia and analgesia journal
2. Anaesthesiology journal
3. Anaesthesia journal
4. Acta Anaesthesia Scandinavia
5. Canadian journal of anaesthesia
6. Indian journal of anaesthesia
7. Expert anaesthesia
8. British Journal of anaesthesia
9. Recent advances in anaesthesiology
10. Year book of anaesthesia
11. Anaesthesia clinics
12. Clinics of North America in Anaesthesiology



