

Syllabus and Examination pattern for Post - Graduate Medical Courses

NOTIFICATION

Ref. :

- (1) Medical Council of India Regulation on Graduate Medical Education, 1997.
- (2) Amendment of the regulations on graduate medical education notified by Government of India from time to time :
 - a. Gazette Notification dated 29.05.1999.
 - b. Notification no. MCI-37 (2)/2001/Med-922, dated 12.04.2001.
 - c. Notification no. MCI-26 (3)/2003/Med-18503, dated 26.09.2003.
 - d. Notification no. MCI-26 (3)/2003/Med-20958, dated 15.10.2003.

In exercise of the powers, conferred under section 26 of Krishna Institute of Medical Sciences Deemed University, the Board of Management in its meeting held on 27th June, 2006, has been pleased to approve the Bye-law pertaining to Post Graduate Medical courses as given in schedule here to Annexed.

The Bye-law as above shall be effective for the students admitted to Post Graduate Medical courses from the academic year 2006-07 onwards.

**By Order
Registrar**

1. This byelaw shall be called Syllabus and Examination pattern for Post-Graduate Medical Course.

M.D. Anaesthesia

At the end of three years of training as residents in anaesthesia, the candidates 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 post-operative 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 neuro-radiology 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, appendectomy, cholecystectomy etc.
- Anaesthesia for various **diagnostic, therapeutic and specialized** procedures.
- Anaesthesia for **Geriatric patients**.
- Anaesthesia for surgery using **LASER**.
- **Anaesthesia / Sedation techniques out side 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.

Training Programme-**A. Administration Of Anaesthesia & Perioperative Patient Care.****I Year Residents:**

Assisting during minor & major anaesthesia procedures and managing patients in recovery or intensive care areas (all Under Supervision).

The first month of the first year will be spent in orientation in the operating rooms and attending lectures covering the basics of the discipline. After that the first year of training will be spent in learning the fundamentals of anesthesiology with emphasis on checking of anaesthesia equipment including anaesthesia machine, airway equipment and appropriate monitors, preparation of appropriate dosages of various drugs required at specific point of time, mastering clinical skills regarding selection and implementation of an appropriate anesthesia plan, placement of lines, induction of anaesthesia, intubation, maintenance of anaesthesia, and the successful reversal of anesthetic agents. Emphasis will also be placed on learning regional anaesthesia and Cardiopulmonary resuscitation. Also the candidates will be assigned guides for thesis so as to help them prepare protocols. To start with the first year residents will observe and then slowly become independent in giving general anaesthesia and Regional anaesthesia to patients belonging to ASA grade I & II for minor and major surgery, under graded supervision. They will be posted in rotation to the following specialties during the first year: Preoperative assessment area, General Surgery, Gynecology, Obstetrics, Orthopedic, ENT, and Recovery Room. They will be assigned to cases in the Operating Room at the hospitals attached to medical teaching institutes affiliated to the University under which they have registered and will gain experience under the direction and supervision of respective academic faculty.

II Year Residents:

Assisting during minor & major procedures under anaesthesia, managing patients in recovery or intensive care areas and Independently conducting minor procedures under anaesthesia (GA/RA) for ASA grade I or II patients (excluding expected difficult airway cases and cases with expected major body fluid shift).

The second year of training will be devoted to the subspecialties/superspecialities of anesthesia at the hospitals affiliated to medical teaching institute and the university under the supervision of a faculty member with an aim to concentrate on mastering the knowledge and technical skills associated with providing anesthesia to subspecialty/superspeciality patients. Residents will be rotated in Pediatric anesthesia, Neuroanesthesia, Cardiovascular and Thoracic anesthesia, Ambulatory anesthesia, Obstetrics, Dental Surgery, Ophthalmology, Pain Clinic / Pain Management, Peripheral

Theatres, Anaesthesia Outside Operating Rooms, Trauma care, Transplant Surgeries etc. They will be taught to give general anaesthesia and regional anesthesia (Extradural Block - EDB, Spinal Block, and Peripheral Nerve Blocks) to ASA grade I, II, III & IV patients under supervision for superspeciality theaters. They should be able to give GA/RA to other ASA grade II patients & I independently. Rotations in critical care areas e.g., Trauma Ward, Post Anesthesia Care Unit / ICU / Emergency Medical Service will also be part of the second year training curriculum. They should learn pediatric and trauma life support and maintain skills for basic and advanced cardiac life support. The student should be able to analyze and present scientific data and write a thesis.

III Year Residents:

Assisting during minor & major procedures under anaesthesia, managing patients in recovery or intensive care areas and Independently conducting both minor and major procedures under anaesthesia (GA/RA) for ASA grade I or II patients (excluding expected difficult airway cases and cases with expected major body fluid shift).

The third (final) year of training will be devoted to management of most complex cases available at the institute under the supervision of a faculty member. The residents will be trained to exercise independent judgment, to take responsibility while caring for such patients, and to take part in research projects under the supervision of a faculty member. The student should be able to plan and administer anaesthesia to all patients under graded supervision including patients for Cardiac, Neurosurgery, and Pediatric surgery and for all major surgery of subspeciality branches. The aim at the end is to be competent and independent soon after the third year of residency in providing anaesthesia to elective and emergency cases belonging to all specialities. The resident should be able to manage critically ill patients and treat intractable pain. They should also know how to organize mass casualty.

B. Thesis -

- The aim of thesis should be to make the student able to demonstrate capability in research by planning and conducting systematic scientific inquiry & data analysis and deriving conclusion.
- Thesis protocol should be submitted at the end of six months after admission in the course to the Research Committee of the Institute. The protocol must be presented in the department of Anaesthesiology before being forwarded. The research committee appointed by the Dean/Principal to scrutinize in references to its feasibility, statistical validity, ethical aspects, etc would approve the Protocol.
- Protocol in essence should consist of:
 - a. Introduction and objectives of the research project.
 - b. Brief review of literature.
 - c. Suggested materials and methods, and (scheme of work)
 - d. Statistician should be consulted at the time of selection of groups, number of cases and method of study. He should also be consulted during the study.
 - e. Bibliography.
- Chief guide for thesis will be from the department of Anaesthesiology and co guide(s), if needed, will be from the department of Anaesthesiology or from other disciplines related to the thesis.
- The thesis shall relate to the candidate's own work on a specific research problem or a series of clinical case studies in accordance with the approved plan.
- The thesis shall be written in English, printed or typed on white A4 size bond paper bearing the matter on one side of paper only and bound with cloth/rexine, with the title, author's name and the name of the College printed on the front cover.

- The thesis shall contain: Introduction, review of literature, material and methods, observations, discussions, conclusion and summary and reference as per index medicus.
- Each candidate shall submit to the Dean four copies of thesis, through their respective Heads of the Departments, not later than six months prior to the date of commencement of theory examination in the subject.

Academic Activities -

Participation by way of attendance / presentation in Didactic lectures, Symposia, Group discussions, Workshops, Morbidity & Mortality meet, Panel Discussion etc. Each Student should actively participated in at least 6 academic sessions per year during the total training period of three total 18).

At the end of III year

Final Assessment (By University)

A. Thesis

- The thesis shall be referred by the University for evaluation to the Examiners appointed by the University.
- The examiners will report independently to the Controller of Examinations and recommend whether the thesis is-
 - a. Approved
 - b. Returned for improvements as suggested or
 - c. Rejected
- The thesis shall be deemed to have been accepted when it has been approved by at least two external examiners and if the thesis is rejected by one of the external examiners it shall be referred to another external examiner (other than the one appointed for initial evaluation) whose judgement shall be final for purposes of acceptance or otherwise of the thesis.
- Where improvements have been suggested by two or more of the examiners, the candidate shall be required to re-submit the thesis, after making the requisite improvements, for evaluation.
- When a thesis is rejected by the examiners, it shall be returned to the candidate who shall have to write it again. The second thesis, as and when submitted shall be treated as a fresh thesis and processed.
- Acceptance of thesis submitted by the candidate shall be a pre-condition for his/her admission to the written, oral and practical/clinical part of the examination.
- Provided that under special circumstances if the report from one or more examiners is not received by the time, the Post-graduate examination is due, the candidate may be permitted provisionally to sit for the examination but the result be kept with held till the receipt of the report subject to the condition that if the thesis is rejected then the candidate in addition to writing a fresh thesis, shall have to appear in the entire examination again.
- A candidate whose thesis stands approved by the examiners but fails in the examination, shall not be required to submit a fresh one if he/she appears in the examination in the same branch on a subsequent occasion.

B. Theory

Paper I -

Basic Sciences related to Anaesthesia (History, Anatomy, Physiology, Pharmacology, Pathology, Physics, Instrument & Equipments, etc)

Paper II -

Theory & Practice of Anaesthesia

Paper III -

Clinical sciences like Medicine & Surgery related to Anaesthesia.

Paper IV -

Recent Advances in Anaesthesia.

C. Practical

Clinical cases as per University Protocol

Viva Voce on equipments, drugs, investigations, laboratory findings etc.

Recommended Reading**I. Books**

1. Lee's Synopsis of Anaesthesia-
G.B.Cashman, N.J.H Davies, 2006, 13th Butterworth-Heinemann.
2. Wylie & Churchill Davidson's - A practice of Anaesthesia-
Thomas E. Healy Paul R. Knight 2003, 7th, Arnold.
3. Anaesthesia-
Miller Ronald D. 2005, 6th, Elsevier Churchill Livingstone.
4. Yao and Artusio's Anesthesiology-
Fun-Sun F.Yao 2003, 5th, Lippincott Williams & Wilkins.
5. Anesthesia and Coexisting Disease-
R. K. Stoelting S.F. Dierdorf 2002, 4th, Churchill Livingstone.
6. Anesthesia and Uncommon Disease-
Fleisher 2005, 5th, Saunders Elsevier
7. Clinical Anaesthesiology-
G.E.Morgan M.S.Mikhail 2005, 4th, McGraw-Hill.
8. Understanding Anaesthesia Equipment-
Jerry A. Dorsch, Susan E. Dorsch 1998, 4th, Williams & Wilkins.
9. Wards Anaesthesia Equipments-
Davey 2005, 5th, Baillirro Tindall
10. Anatomy for Anaesthetists-
Harold Ellis Stanley Fieldman 2005, 8th, Blackwell Science.
11. Pharmac. & Physiology in Anaesthetic Practice -
R. K Stoelting, S.C.Hillier 2006, 4th, Lippincott-Raven.
12. Shnider and Levinson's Anesthesia for Obstetrics-
Hughes Levinsons Rosen 2002, 4th, Lippincott Williams & Wilkins
13. Paediatric Anaesthesia-
Gregory 2005, 4th, Churchill Livingstone.
14. Cardiac Anesthesia
Kaplan 2005, 4th, W. B. Saunders & Co.
15. Thoracic Anesthesia -
Kaplan 2003, 3rd, Churchill Livingstone.
16. Clinical Application of Mechanical Ventilation-
David W. Chang 2001, 2nd, Delmar-Thomas Learning.

II. "Recent Advances in Anaesthesia and Analgesia" Last two Editions: Mosby Publications.

III Journals

1. Indian Journal of Anaesthesia 5. Anaesthesia.
2. Journal of Anaesthesiology and Clinical Pharmacology 6. British Journal of Anaesthesia.
3. Indian Journal of Critical Care Medicine 7. Anesthesia & Analgesia.
4. Anesthesiology Clinics of North America 8. Anesthesiology