

DM Neuroanaesthesia program

Department of Anaesthesiology

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Aims and Objectives

The DM Neuroanaesthesiology program in SCTIMST is a 3-year course which involves training of students already having a postgraduate degree (MD/DNB) in Anaesthesiology in theoretical and practical aspects of Neuroanaesthesia. Based on the training, after the 3-year period, the specialist ‘Neuroanaesthesiologist’ is expected to have an in-depth, comprehensive knowledge of all facets

of neurological, neurosurgical diseases and their management, have skills to effectively deliver anaesthetic and critical care of these patients, and have attitudes and behavior consistent with highest professional standards and contribute to future research.

The candidate is expected to learn to deliver “state of the art” clinical care in a scientific, cost effective, ethical and compassionate manner to an individual and patients, and also develop an attitude of committed learning, teaching, and research for the welfare of the society.

Competence expected at end of training

At the end of this training, the resident shall be able to;

1. Demonstrate sufficient understanding of knowledge in the subject of Neuroanaesthesiology
2. Develop the ability to take discerning history from the patient, perform relevant clinical examination, decide the appropriate investigations and derive the anaesthetic management plan during surgery
3. The residents acquires a reasonable level of theoretical and practical knowledge that enables him to provide perioperative and critical care of neurologically ill patients with due consideration to patient safety and economy.
4. Well versed and confident in performing the common procedures independently and other procedures under limited supervision at the end of three years.
5. Well versed in advanced patient monitoring techniques like trans esophageal echocardiography, cardiac output monitoring, EEG, evoked potential monitoring etc.

6. Develop into an effective communicator to the patients, their family, colleagues and students.
7. Develop essential skills in conducting medical research, and to get them presented in scientific forums and published in peer-reviewed journals.

Theoretical knowledge to be acquired

At 18 months

The candidate is expected to acquire theoretical knowledge of the following during the period of training

Anatomy

- a. Anatomy of the brain including the cranial nerves, the spinal cord, the peripheral nerves and the muscles
- b. The vascular anatomy of the central nervous system, extra cranial vessels.
- c. Anatomy of the head, neck, airways, lungs and heart, vertebral column

Physiology

- a. Normal Physiology of the central nervous system, muscle, respiratory physiology, cardiovascular physiology, hepatic and renal physiology and their alteration in diseased state

Pathology

- a. The pathologies affecting central nervous system, respiratory system, cardiovascular system, renal and hepatic system and the implications of these pathologies in the anaesthetic management of the patients presenting with the pathology.

Pharmacology

- a. Basic understanding of pharmacokinetics of drugs and pharmacodynamics of drugs used in anaesthesiology with relevance to brain and spinal cord. Their mechanism of action, metabolism, adverse effects, drug interactions, drug development, and practice of prescription utilizing best scientific evidence.
- b. Understanding of pharmacokinetics of drugs and pharmacodynamics of drugs used in treating nervous system, renal, cardiac disease, metabolic disorders. Their mechanism of action, metabolism, adverse effects, drug interactions and their impact in anaesthetic management.

Microbiology

- a. Understanding the epidemiology, etiology, pathogenesis, investigational and therapeutic management, prevention of infectious diseases encountered in the neurologically ill patients

Research methodology

- a. Basics of statistical methods, type of studies, issues involved in scientific methods and interpretations. Data presentation, Sample size calculations, Planning and conduct of a study, Confidence interval, Standard error, Standard deviation, Sensitivity, Specificity, type 1 and type 2 errors, Distribution of variables, Null hypothesis, Correlation coefficient, Tests of significance, Parametric and non-parametric tests, odds ratio, Student's t test, ANOVA, Analysis of covariance, Regression, ROC curve, Use of software for data analysis (SPSS, SAS).

Anesthetic Equipment

Basics, indication, techniques, safety of equipment used in anesthesia and critical care.

At 36 months

Investigations and Monitoring

- a. A thorough knowledge of basic principles, indications, technique, results, strength and limitations of various diagnostic tests is essential. Proficiency in independently ordering, performing and interpreting some of these investigations is essential, and accrue from a large number of tests performed under supervision and independently as subsequently suggested. These include invasive and non-invasive investigations.
- b. Non-invasive investigations: biochemistry, Chest X-ray, ECG, Transthoracic and trans esophageal Echocardiogram, ultrasonography, NIRS, TCD, Brain and spinal cord CT and CT angiography, MRI and MR angiography, and electrophysiological monitoring like EEG, E0CG, evoked potentials, nerve conduction studies.
- c. Invasive Monitoring: Cardiac hemodynamics (invasive arterial pressure, central venous pressure, cardiac output) arterial blood gas analysis, jugular venous oximetry, Digital subtraction angiography, cerebral blood flow, ICP measurement

Anaesthetic management

- a. Anaesthetic management of patients undergoing neurosurgical procedures for different pathologies.
- b. Anaesthetic management of patients for diagnostic and interventional neuro radiological procedures
- c. Anaesthetic management of patients presenting for diagnostic procedures like CT, MRI

Critical care Management

- a. Neurocritical care of patients with various diseases
- b. Anesthetic and Critical care management of Trauma patients

Pain

- a. Understanding the etiology, pathophysiology, diagnosis and management of disease conditions responsible for various pain syndromes

Scientific Advances

- a. Recent advances in the field of anesthesia, neurology and neurosurgery in relation to perioperative and critical care of neurologically ill.

Biomedical engineering

- a. Basic understanding of physical principles of various biomedical instruments and devices used in diagnosis and therapeutics with a view to optimally utilize them.

Patient Safety

- a. Basic understanding of the epidemiology, Risk factors, diagnosis, management reporting and preventive aspects of adverse events in relation to patient management

Practical / Clinical / Laboratory experience to be imparted at year I, year II, Year III

1st year

Clinical skills: Include the ability to take discerning history, perform relevant clinical examination, decide the appropriate investigations and derive the anesthetic and perioperative management plan

At the end of 1st year, the candidate will be trained and is expected to be proficient in the following areas;

1. Basics of cannulation(arterial, central venous cannulation including ultrasound guided cannulation)
2. Basic understanding and interpretation of arterial blood gas analysis
3. Management of acid base and electrolyte disorder in the operation theater as well as intensive care unit
4. Basics of hemodynamic, respiratory monitoring
5. Basics and advanced mechanical ventilation in critical care patients

6. Anesthetic management of uncomplicated adult neurosurgical patients independently
7. Anesthetic management of complicated adult neurosurgical patients under supervision
8. Transfer of high risk patients to neuro investigation procedures
9. Basics of sterility, CPR, infection control.

2nd year

Clinical skills: Include the ability to take discerning history, perform relevant clinical examination, decide the appropriate investigations and derive the anesthetic and perioperative management plan

At the end of 1st year, the candidate will be trained and is expected to be proficient in the following areas;

1. Basics of Transesophageal echocardiography (views, indication, contraindications, handling the probe) in detecting venous air embolism, monitoring in hemodynamically unstable patients.
2. Basics of transcranial Doppler and interpretation in the Operation Theater and ICU.
3. Basics, techniques of use, indications, contraindications of various airway equipments in difficult intubation and in patients with cervical spine instability.
4. Basics of jugular venous oximetry, near infrared spectroscopy and their clinical application.
5. Anesthetic management of uncomplicated neurosurgical patients independently.

6. Anesthetic management of complicated neurosurgical patients independently
7. Manage the patients during emergency neurosurgery independently
8. Manage pediatric patients for various diagnostic and neurosurgical procedures under supervision
9. Basics of Evoked potential monitoring and interpretation of abnormalities under supervision
10. Ability to interpret the laboratory values, X-ray, CT, MRI and manage patients accordingly under supervision
11. Ability to identify, manage and report compromise in patient safety during procedures.

3rd year

Clinical skills: Include the ability to take discerning history, perform relevant clinical examination, decide the appropriate investigations and derive the anesthetic and perioperative management plan

1. Anesthetic management of uncomplicated neurosurgical patients independently.
2. Anesthetic management of complicated neurosurgical patients independently.
3. Manage the patients during emergency neurosurgery independently.
4. Manage pediatric patients for various diagnostic and neurosurgical procedures independently.
5. Manage anesthesia care of patients undergoing various intervention neuro radiological procedures independently.
6. Basics of Evoked potential monitoring and interpretation of abnormalities independently.
7. Able to perform neurological examination and come to a diagnosis in the ward and ICU.
8. Proficient to manage neurotrauma independently.

9. Ability to interpret the laboratory values, X-ray, CT, MRI and manage patients accordingly independently.

Practical skills

The candidate should be able to perform and interpret relevant investigations independently, and should have a firm grasp on many others. To assure this, a minimum numbers are mandatory as given below;

Non-invasive

ECG interpretations	50
Transthoracic echocardiography	50
Transesophageal echocardiography	50
CT interpretations	50
MRI interpretations	50
DSA	25
EEG/ECoG	50
Transcranial Doppler	50
Evoked Potentials	50

- a. **Invasive:** The training in invasive procedures is designed to provide maximum possible experience to the residents. These procedures should be under the supervision of a faculty member without affecting the safety of the patients at any cost. The goal of

fixing the minimum number of cases to be performed is to make the resident well-versed and confident in performing the common procedures independently and other procedures under limited supervision at the end of 3years. The minimum number of each procedure to be undertaken by the resident is given below, and the number as the primary operator under supervision is given in brackets:

Invasive arterial line	100 (20)
Central venous cannulation	50(20)
Ultrasound guided central venous cannulation	25 (10)
Anesthesia for Intracranial Aneurysms/AVMs	50(10)
Anesthesia for Intracranial tumors	50(20)
Anesthesia for Shunt/endoscopy Procedures	5(10)
Anesthesia for Spinal Procedures	25(10)
Anesthesia for Pituitary surgery	25(10)
Anesthesia for pediatric neurosurgery	15(10)
Anesthesia for MRI	25(15)
Anesthesia for CT scans	25(10)
Anesthesia for aneurysm coiling and AVM Embolization	50(10)

Percutaneous tracheostomy	5(5)
Awake Fiberoptic intubation	5(5)
ICP monitoring	3(3)
Jugular oximetry	3(3)

Textbooks and Periodicals/Journal

1. Miller's Textbook of Anesthesiology
2. Cotterel and Young 'Textbook of Neuroanaesthesiology'
3. Dorsch and Dorsch 'Understanding Anesthesia Equipment'
4. Calvey and Williams 'Principles and Practice of Pharmacology for Anaesthetists'
5. Trauma (A text book of Trauma society)
6. Aage R Moller 'Intraoperative neurophysiological monitoring'
7. David Sidebottom 'Practical perioperative echocardiography'
8. Paul Brazis 'Localization in neurological diseases'
9. Tobey 'Neurocritical care'
10. Greenberg's 'Handbook of Neurosurgery'
11. Aviva Petrie 'Medical statistics at a glance'
- 12 Stephen Waxman 'Clinical Neuroanatomy'
13. Arun K. Gupta, Adrian W. Gelb 'Essentials of neuroanesthesia and neurointensive care'
14. Steve Waldman 'Pain Management'

Journals

1. Journal of Neurosurgical Anesthesiology
2. Anesthesia and Analgesia
3. British Journal of Anaesthesia
4. Anesthesiology
5. Acta Anaesthesiologica Scandinavica
6. Neurocritical care
7. Neurosurgery
8. Journal of Neurosurgery, Spine and Pediatrics
9. Pain

Residents Postings

The residents will acquire the knowledge by undergoing training in the following areas

NEUROSURGICAL OPERATION THEATERS

ICU POSTING-2 MONTHS/YEAR

CATHLAB-2 MONTHS/YEAR

NEURORADIOLOGY DEPT-10 DAYS

NEUROLOGY DEPT-10 DAYS

NEUROSURGERY DEPT-10 DAYS

BIostatISTICS-ONE WEEK

BIOTECHNOLOGY-ONE WEEK

ACADEMIC COMMITTEE OF THE DEPARTMENT

The structure and role of academic program committee

The academic program committee consists of Head of the Department, Program in charge, Program coordinator, Mentor, Guide, Moderator and Resident Academic In charge. Following are the responsibilities of each in the academic activities of the department.

A. Role of HOD:

1. Overall supervision of the conduct of academic programs and evaluation process in the department.
2. Assess the quality and adequacy of content of academic program.
3. Evaluate the progress of each student through the APC.
4. He / She will be member of the appraisal committee and will assess the remedial measures taken to enhance performance of the resident/student.
5. Conduct of the external examination and supervision of conduct of internal examinations.

B. Role of Program in charge (P.I.C)

1. Will be responsible for ensuring the implementation of academic programs as envisaged by the BOS.
2. Assign equal number of academic programs for each resident for each year and ensure it is conducted
3. Supervise the conduct of evaluation of academic programs by PC
4. Supervise the internal evaluation process
5. Organize external and internal examinations
6. Verify and validate entry of marks in the e-portfolio after it has been Verified and validated by PC.
7. Report to BOS/academic council, deficiencies, suggestions and feedback on the upgraded curriculum and evaluation.

C. Role of program coordinator

1. Circulate monthly academic roster of department and send a copy to the academic division for its records.
2. Maintain dossier for each student till the end of the course
3. Circulate and collect evaluation forms after each academic program
4. Maintain register of attendance in academic programs of both students and faculty. In the attendance of faculty indicate why someone was not available (sabbatical, casual leave, duty leave, research posting, emergency surgery, OP duty) or for students (emergency, CL, duty leave). There should be no entries after the session is over. The names and number of faculty who did the evaluation should be clear on the evaluation form. A minimum of

3 members should evaluate. If sufficient number of faculty is available in a dept., senior residents programs are to be evaluated by faculty at the level of associate professor and above.

5. Enter and validate entry of information and marks for each student for each program at the end of each month in the e-portfolio.

6. E-portfolio entry, if made by dept secretary, should be verified and validated

7. Monitor log book entries

8. Organize appraisal meetings

9. Collect student feedback

10. Organize internal examination

11. Report to PIC periodically about progress and problems with implementation and resolve them. Can seek guidance from academic council if needed

D. Mentor and role

Each student should have a mentor in the department

The mentor could be the thesis guide for post-doctoral courses or any other faculty member nominated by the APC.

He/ She can guide the student in the selection of appropriate thesis topic, process of submission to TAC and IEC, both procedures being mandatory.

Ensure participation and presentation in a national conference-mandatory requirement

Guidance for publication of research paper

Review abstract submitted for conference and ensures that abstract is sent to e-portfolio

Participate in appraisal meeting conducted by departmental academic

Committee and assist in planning remedial actions for candidates' progress

Guide and counsel students in managing work and stress

Guidance students in planning their careers

E. Guide-

Appointed by the HOD to help in the thesis of a particular resident. He along with the resident identifies topics, help in resident in getting ethics approval, writing proposal

for funding if required, monitors the conduct of study including adverse events. He/ She reports to **Program Incharge** about the progress of thesis.

F. Moderator

Appointed by Program coordinator to identify topics for journal club, helps the resident in seminars.

G. Resident Academic In charge

Identifies the cases and radiological films to be presented for discussion. Discuss with fellow colleagues at intervals to find out problems and report to the Program Incharge

List of monthly academic programs for curriculum implementation:

	Academic session	Day	Time
1	Bedside Case discussions	Thursdays & Fridays	3-5 pm
2	Journal club/ Recent advances	Tuesdays	3-5 pm
3	Problem oriented medical discussion	Monday	3-5pm
4	Seminars/symposium	Saturday	10-12 noon
5	Seminars	Saturdays	2-4 pm
6	Critical care case discussion	Saturday	8-10 am
7	Radiology rounds	Wednesday	3-4 pm

Thesis

Requirements of thesis, its external evaluation

The candidate should be involved in research projects **of which one** is mandatory. The mentor or the guide of the project will be identified by the **Head of department** in consultation with the **Program in Charge** in the initial 6 months. The areas of project work should be decided in discussion with these mentors, and the research project should be presented in the departmental research meeting at the end of 9 months of joining the training period. The projects should be modified as per the suggestions from the department, and presented for approval from technical advisory committee and institute ethical committee. The regular progress of research work should be presented at 3-monthly research meetings in the department. **The completed research work should be presented at completion of 30 months of residency.** The completed thesis will be sent for external evaluation to examiner or expert from the panel and evaluation may be completed within two months.

L. Publication requirement

The research projects after completion should have been published or publishable in peer reviewed journals at the end of training period after the thesis evaluation by external examiners. The residents should have at least one clinical paper submitted in a peer-reviewed journal indexed in “Index Medicus” prior to appearing the final examination.

M. Conference participation requirement

Residents are encouraged to attend conference and present papers.

A minimum of one abstract presentation at conference at either national or regional/state level is also mandatory.

Internal evaluation

The examination includes internal assessment during the tenure and external examinations at the end of 18 months and at the completion of the 3 year course. It should include both theory and practical aspects. Maintaining an appropriately documented clinical dossier as evidence having undertaken the minimum required training activities is essential. The external examination should be conducted in an appropriate manner befitting the highest academic degree. It should include both theoretical and practical evaluation.

An objective examination will be conducted covering the modules discussed at every six month interval (3 each 1 ½ year) and will be evaluated for internal assessment. A minimum of 50% scoring is required for clearing the module. If the candidate gets lesser than 50%, a reappraisal can be done as per the BOS requirement.

E-portfolio and Log book

The students should maintain a logbook regarding the clinical, laboratory, academic activities they were involved, verified and countersigned by the consultants. An e-portfolio will be maintained by Program Coordinator for each student. The credits obtained by the student based on their clinical, academic performances, marks in the internal exam will be entered in the e-portfolio. The e-portfolio will be accessible to students which will enable them in judging their own performance at each year.

Contents of E-portfolio for each student

I. General information: Name, employee code, dept., course, year of joining, year of evaluation

II, Evaluation of academic programs

A. Name of academic activity

E.g. Journal club 1, 2, 3, 4, 5,

Seminar 1, 2, 3,

Before each academic activity

1. Name of topic (will link to archived file)
2. Name of Moderator
3. Actual marks scored

C. Each module clinical postings, Lab, OT etc

1. Name of Posting
2. Duration
3. Marks scored for each posting
4. Credit for the module

At the end of the year Grade will be assigned based on total mark for the module.

For external posting each department has to formulate the evaluation form that has to be sent to the supervisor of the Lab, posting.

D. Mandatory courses.

Statistics: Attendance, marks, grade

BMT posting: Attendance marks, grade

E. Conference participation

1. National, international, regional
2. Type of presentation
3. Name of conference, venue
4. Organizer of conference
5. Title of abstract and link to
6. Awards if any

F. Any extra-curricular activities

EVALUATION OF CANDIDATES

The evaluation is based on internal and external evaluation. A total of 1000 marks is distributed as follows

Internal evaluation-200 marks

Part 1(2 theory papers) =200 marks

Part 2(2 theory Papers) =200 marks

Clinical & Practical Examination =400 marks

a. Internal Evaluation

Total marks for internal evaluation =200. This will be derived from the marks scored in the academic activities. The total marks will be divided as 50 marks for 1st year, 50 marks for 2nd year and 100 marks for 3rd year. Each academic activity's mark will be based on the credit assigned to the activity. This will be finally converted to a score out of 200, which will be converted also to grade. The total marks for that year will be assigned at the end of each year based on the credit of the students' academic performance of that year and will be recorded in the E-portfolio. It will be made available to students at the end of each year. Pass requirement 50%. If student gets less than 40%, he/she cannot appear for final exams. Repeat the course for 6 months.

Grading

All academic programs will be evaluated. Each academic activity and module will be evaluated and marks allocated according the credits for the activity or module. The final marks at the end of each year will be converted to absolute grades

A = >80%, B=60 to 80%, C = 40 to 59%, D =<40%.

B External examination

Part 1: At the end of 1 ½ year the candidate will take up Part 1 examination which consists of two theory papers each 100 marks. Pass requirement 50% in each paper. If a candidate fails to get 50% in first attempt, he should pass the exam within a year. (Next Two 6 monthly attempts) Otherwise he will not be eligible to appear in the final exam.

Part 2: At the end of three years of training the candidate will take up Part 2 exam which consists of

1. Two theory papers each 100 marks. Pass requirement 50% in each paper.
2. Practical and Clinical examination (400 marks)

The practical examination consists of Case discussion, Viva Voce, Pass requirement 50%. The following are the breakup of marks for the practical exam;

- a. One long case- 100 marks
- b. Two short case-100 marks
- c. Viva voce-50 marks
- d. X-rays, CT, MRI,DSA-50
- e. ABG, ECG, Echo, TCD, ICP, Evoked potentials,SjVo2-50 marks
- f. Drugs evaluation-25 marks
- g. Equipment evaluation-25 marks

SYLLABUS FOR DM (NEUROANESTHESIOLOGY)

PART-I BASIC SCIENCES

1. **APPLIED ANATOMY:** Basic and correlative anatomy of the Nervous system (brain, spinal cord, cranial and peripheral nerves), neurovascular anatomy. Embryological development of brain, spinal cord, skull and spinal structures.
2. **APPLIED PHYSIOLOGY:** Basic and correlative neurophysiology, positioning and its complications, ventilation & ABG, cardiovascular and respiratory physiology in relation to nervous system
temperature control, autonomic function
3. **APPLIED PHARMACOLOGY:** Basic and correlative pharmacology of drugs acting on the nervous system and principles of neurotherapeutics.
4. **APPLIED PATHOLOGY:** General and Medical neuropathology.(eg ICP, cerebral edema, neurogenic pulmonary edema, ARDS, disorders of fluid, electrolyte, blood glucose, biomarkers)
5. **APPLIED MICROBIOLOGY:** Pulmonary infections, infection of brain and its meninges, infection following Neurosurgery, and nosocomial infection in the intensive care units.

6. **NEURO APPLIED ENGINEERING:** Concept of developing hydrocephalus shunt, emphasis on types of investigative facilities for assaying various drug levels in the brain and CSF and their clinical correlates.

7. **Biostatistics-** Sensitivity, specificity, type 1& 2 errors, correlation coefficient, Regression analysis, odds ratio, planning a study

PART II- CLINICAL SCIENCES

1. Clinical and anesthetic management of patients undergoing surgery of brain, spinal cord, skull, spine and peripheral nerves. (eg Tumors, trauma, vascular, movement disorders, epilepsy, endoscopy, image guidance)
2. Intensive care of patients following Neuro surgery.
3. Anesthetic management of cases undergoing Neuro investigation and therapeutic interventional procedures.
4. Recent advances in Neuroanesthesia, Neurosurgery
5. Neuromonitoring
6. Neuroradiology
7. Neuroprotection, neuronal plasticity, gene therapy
8. Chronic pain syndromes, Neuropathic Pain, Trigeminal neuralgia
etc- management

SCHEME OF EXAMINATION

Part-I (At the end of 18 months of study)

Paper-I - 3hrs- 10 short essay type of questions in applied neuroanatomy, Applied neurophysiology **(5 marks each)**

Paper-II - 3hrs- 10 short essay type questions on applied pharmacology, Applied pathology, applied microbiology and applied Neuro engineering, biostatistics (5 marks each)

Part-II (To be taken at the end of the course and after passing Part-I)

Paper-I - 3hrs. 10 short essay types related to perioperative management in Neurosurgery, and Neuroradiology (5 marks each)

Paper-II -3hrs. 10 short essay type questions on Neuromonitoring, Recent advances in Neuroanaesthesia, Pain management, ICU management (5 marks each)

Credit-based evaluation

Students will be evaluated for internal marks based on a credit based system by the faculty of the department. At the end of the course the performance of the candidates will be converted to grades. The grading will be based on the performance in each module with specified maximum credits against them.

The respective modules, with the maximum credits allotted against them, are given below.

SI No.	Module	Credits
1	Patient evaluation and management	52
2	Analysis and interpretation of Monitoring	30
3	Academic presentation	40
4	Evaluation of Project work	20
5	Mandatory postings	18
6	Internal Evaluation	30
7	Outstanding contribution and awards	5
8	Additional Publication	5
	Total	200

A. Module I : Patient evaluation and management (52 Credits)

I. Preoperative assessment (6 credits)

The evaluation tools will be as follows,

1. Evaluation of his understanding of the clinical problem of patients posted for surgery under his charge and recognition using clinical laboratory parameters of patientt's progress, deterioration or complications.
2. Identification of all clinical issues setting targets to be achieved.
3. Clinical appreciation of bedside signs and symptoms
4. Interpretation of all laboratory and invasive and noninvasive test results
5. Patient education and counseling especially with respect to preoperative life style, diet, exercise, behavior modification & drugs and drug interactions.
6. Pre anesthesia chart quality and completeness

2. Assessment of Management in OR/outside OR (20 credits).

1. Conduct of anaesthesia
2. Technique of intubation, invasive lines
3. Ability to interpret monitoring data and appropriate therapy
4. Ability to foresee complications and avoid it.
5. Record keeping

6. Patient safety concerns

7. Ability to use the theory knowledge appropriately in management

8 Interpersonal relation with other colleagues, staffs in OR

3. Inter department Consultations (6 credits)

1. Number of the patients identified with new problem / worsening of existing clinical issues requiring change of management plan and management discussed with consultant and also charting out plan of management, with all relevant investigations.
2. Identification of critically ill patients and channeling their acute management.
3. Inter-departmental consultations

4. ICU and Emergency (10 Credits)

This includes evaluation of patient management in the ICCU (newly admitted, transferred from wards, transferred after intervention procedure, etc and charting out plan of management and carrying out the same.

ICU training will include all emergency procedures,

1. Airway management, including endo tracheal intubation,
2. Ventilator management and blood gases interpretation,
3. CPR, CPR protocol. Acute rhythm management,
4. Central venous cannulation, arterial line cannulation,
5. Fluid and electrolyte management,

6. Acute pain and sedation,
7. Weaning from ventilator,
9. Interpretation of chest X-rays, biochemical and radiological investigations
10. Transportation to CT and MRI,
11. Documentation and
12. Patient safety

Invasive Skills (10 credits)

- 1 Central venous catheter insertion
- 2 Arterial line insertion
3. Percutaneous tracheostomy
4. SjVO₂ monitoring

Airway management (5 credits)

Ability to evaluation of the airway and used of modern equipment's appropriately

Module II: Analysis and Interpretation of Monitoring (30 credits)

1. Evaluation of ECG, Chest X-rays: Reporting and Analysis (6 credits)

Reporting at least 25 ECGs and chest X-rays

1. To have a collection of 25 ECGs with all known abnormalities and Chest X-rays collected in a log book.
2. The evaluation will be based on the quality of the log book submitted

2. Transesophageal& transthoracic Echo (6 credits)

To maintain a soft copy of 10 patients' cine-loop images for evaluation including cardiac output, venous air embolism, PFO, LV functions.

3. Transcranial Doppler(6 credits)

To maintain soft copy of at least 10 TCD including vasospasm, reduced flow preoperative and postoperative evaluation

4. EEG, ECoG (6 credits)

To maintain at least 5 soft copies of EEG and ECoG preoperative and postoperative evaluation

5. Evoked potential monitoring(6 Credit)

To maintain at least 5 copies of evoked potential monitoring data.

Module III: Academic Presentation (40 credits)

1. Journal Review (Duration 30 min.) [10 credits]

Purpose of journal presentation is to instill qualities of enquiry and analysis of scientific medical articles and to evaluate its relevance and impact in understanding pathobiology of disease or in clinical management. The resident can select recent articles of clinical relevance, or consult the faculty to help select scientific articles with original research content for presentation. The presentation should reflect the resident understands of the problem under discussion and the outcome and analysis of the results with regard to various aspects of disease state and the clinical relevance. 3-4 articles with brief exposition of the highlights of the study and its clinical relevance and the take home message. The senior resident should submit a short report of the articles presented in print with a copy for the dept. and one for the individual, highlighting the aim, methodology, patient recruitment criteria, results, discussion and implications for clinical practice. The oral presentation and the write up will be equally weighted.

2. Problem Oriented Case Discussion (45 min each) [10 credits]

The purpose of this exercise is to identify daily clinical problems confronted during the routine hospitalization and management of patients, clinical problems significant enough to influence patient management (diagnosis/therapy). The literature review will be up to date, and will enable evidence based approach to patient management in different clinical scenarios. The assessment will be based on the following parameters; review of the literature to chart out evidence based management plan and to write up a short report on the clinical problems and the current state of the art management and the level of evidence for such management option. The oral presentation and the write up are equally weighted for purpose of evaluation.

3. Seminar (45 min each) [10 credits]

It is intended to encourage extensive literature review on the topic and present the highlights of the topic under review in a succinct manner with clear take home messages, but at the same time the extensive literature search elevates the presenter as an authority on the topic. The topic should be prepared as a review article with complete bibliography in a publishable format, along with the topic presentation. The presentation and the write up are equally weighted.

4. Assessment of Bedside Clinical Presentation (6-8/year) (10 credits)

1. History taking, presentation and analysis of history.
2. Physical findings, presentation and discussion with differential diagnosis.
3. Investigation-ECG, echo Doppler, X ray, laboratory investigations.
4. Final Diagnosis: Physiological abnormalities/anatomical defects / etiology/ functional class / associated conditions/ complications
5. Further evaluation / Laboratory / Invasive investigations and plan of patient management including a prescription of non- pharmacological advice and pharmacological treatment with plan for review.

ModuleIV. Evaluation of Projects (One 20 credits)

1. Mid-term evaluation of projects mandatory and will carry credits
2. Prospective / Retrospective Study
3. Ethical Committee clearance / Institute funding obtained
4. Contribution of candidates experience in the study
5. Descriptive data collection / Quantitative data subjected to statistical analysis.
6. Midterm Review: At 18 months of DM course: Aims and objectives, review of literature, materials and methods (exclusion / inclusion criteria), data collection and presentation (% of target of the project) and preliminary data analysis.
7. Review at 30 months: Presentation of the full project as thesis and also in publishable form, complete with statistical analysis, discussion, study limitations, conclusion, and bibliography.
8. Overall impact of the project in adding to our knowledgebase, and patient management. Between 30-34 months, the project should be sent for publication to peer reviewed journals.
9. Presentation of the project work as scientific presentation at national level and at state level- mandatory.

List mandatory courses and fixed credits (BMT, biostatistics)

- 1 Medical Statistics and research methodology. (CREDIT=5)
2. Biomedical Technology posting. (CREDIT=3)
3. Submission or Publication in a journal(CREDIT=5)
4. Presentation of Paper in national Conference(CREDIT=5)

100% attendance is mandatory for Biomedical Technology and biostatistics.

Module V. Internal Examination (40 credits)

There will be 5 internal examinations, each having 100 marks during the 3-year course. These examinations will have objective questions, applied aspects like case based scenarios. It will be evaluated by the faculty members of the department. The results will be conveyed to the residents as a part of the regular appraisal.

Exam	MONTH OF CONDUCT	TOPICS
1(after 6 months)	JUNE	Comprehensive Anatomy of Brain, spinal cord, Pathways, airways Applied Physiology of central nervous system, respiratory, applied cardiovascular physiology
2(after 12 months)	DECEMBER	Pharmacology of anesthetic drugs and drugs used in CNS and cardiovascular diseases, Pathology of CBF, cerebral edema, ICP, Ventilation, ABG
3(after 17 months)	MAY	Airway equipment, Neuromonitoring, Radiology
4(after 23 months)	NOVEMBER	NeuroTrauma, Neurocritical care
5(after 30 months)	JUNE	Recent advances in diagnostic and therapy in CNS disorder, Chronic Pain

Module VI Outstanding achievements and Awards (5 credits)

A resident, who is outstanding in research or academic activities, has publication in high impact journals or getting awards in conference qualifies for additional credits which are given as follows;

Assessment of the outstanding achievements can be made using the following criteria;

1. Attendance & Punctuality
2. Overall marks scored in the exams
3. Publication in high impact journals
4. Contributions to patient management.

Module VII(Additional Publication)

Additional Papers published by the candidate in the journals (high impact >2) can be given a credit of 5

Student feedback and Reappraisal

Feedback form from student at the end of completion of each module and seminars will be mandatory and will be handed over to Program in charge for identifying deficiencies and making corrective actions. Moreover six monthly meetings with the residents by Program coordinator will be conducted to get their overall feedback and academic progress and will be reported to head of department.

Mentoring / monitoring / counseling mechanism to identify deficiency

An objective examination will be conducted covering the modules discussed at every six monthly interval (3 each 1 ½ year) and will be evaluated for internal assessment. A minimum of 50% scoring is required for obtaining adequacy of skills in the module. If the candidate gets lesser than 50%, reappraisal can be done as per BOS guidelines.

ANNEXE

SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES AND TECHNOLOGY

TRIVANDRUM, KERALA

EVALUATION FORM FOR CLINICAL PRESENTATION

Name of the student:

Name of the Faculty / Observer:

Date:

Sl. No.	Items of observation during Presentation	Poor 0	Below average 1	Average 2	Good 3	Very good 4
1	Completeness of history					
2	Accuracy of clinical signs					
3	Clarity of Presentation					
4	Assessment of problem and investigational plan					
5	Anesthesia management/Treatment plan					
6	Ability to defend diagnosis and plan					
7	Knowledge of the current and past literature					
	Grand Total					

EVALUATION OF JOURNAL REVIEW PRESENTATIONS

Name of the Student:

Name of the Faculty / Observer:

Date:

Sl. No.	Items of observation during Presentation	Poor 0	Below average 1	Average 2	Good 3	Very good 4
1	Extent of understanding of scope & objectives of the paper of the candidate					
2	To critically evaluate methods, analysis and interpretations of study					
3	Whether cross references have been consulted					
4	Whether other relevant publications consulted					
5	Ability to respond to questions on the paper / subject					
6	Ability to defend the paper					
7	Clarity of Presentation					
8	Audio – Visual aids used					
9	Ability to propose new research ideas based on study discussed					
	Total Score					

EVALUATION OF SEMINAR PRESENTATIONS

Name of the student:

Name of the Faculty / Observer:

Date:

Sl. No.	Items of observation during Presentation	Poor 0	Below average 1	Average 2	Good 3	Very good 4
1	Whether all relevant publications consulted					
2	Understanding of the subject					
3	Completeness of the preparation					
4	Clarity of presentation					
5	Current concepts coverage					
6	Ability to answer the questions					
7	Time scheduling					
8	Appropriate use of Audio – Visual aids					
9	Overall performance					
10	Any other observation					
	Total Score					

EVALUATION OF CLINICAL WORK IN OT/WARD/ICU

Name of the student:

Name of the Faculty / Observer:

Date:

Sl. No.	Items of observation during presentation	Poor 0	Below average 1	Average 2	Good 3	Very good 4
1	Regularity of attendance and punctuality					
2	Presentations of cases during preops					
3	Maintenance of anesthesia case records					
4	Investigations work up					
5	Interaction with colleagues and supporting staff					
6	Teaching and training junior colleagues					
7	Bedside (OT table)Manners					
8	Anticipation of complications					
9	Vigilance in OT and case follow up					
10	Overall quality of clinical work					
	Total Score					

LOG BOOK

Table 3: Anesthesia cases performed

Name:

Admission Year:

College:

Date	Name	I D No.	Procedure	Category A, PA, PI*

Key:

- A - Assisted a Consultant
- PA - Performed procedure under the direct supervision of a Consultant
- PI - Performed independently

LOG BOOK

Table 4: Skill based procedures performed

Name:

Admission Year:

College:

Date	Name	I D No.	Procedure	Category A, PA, PI*

Key:

- A - Assisted a Consultant
- PA - Performed procedure under the direct supervision of a Consultant
- PI - Performed independently

MODEL OVERALL ASSESSMENT SHEET

Name of the college:

Academic Year:

Sl. No.	Particulars	Name of the student and Mean score									
		A*	B*								
1	Journal Review presentations										
2	Seminars										
3	Clinical work in wards										
4	Clinical Presentation										
5	Teaching skill practice										
	Total Score										

Note: Use separate sheet for each year.

Signature of the HOD:

Signature of the Dean:

The above overall assessment sheet used along with the log book should form the basis for certifying satisfactory completion of course of study, in addition to the attendance requirement.

FINAL ASSESSMENT SHEET

Name of the Candidate:

Academic Year:

Particulars	Maximum Marks	Actual Marks			
		I year	II Year	III Year	OVERALL
PATIENT EVALUATION MANAGEMENT	52				
INTERPRETATION OF MONITORING	30				
ACADEMIC PRESENTATION	40				
PROJECT WORK	20				
STATISTICS	5				
BIOTECHNOLOGY	3				
SUBMISSION OF PAPER	5				
CONFERENCE PRESENTATION	5				
INTERNAL EVALUATION	30				
OUTSTANDING CONTRIBUTION	5				
PAPER PUBLICATION	5				
TOTAL	200				

Signature of the HOD:

Signature of the Dean:

The above overall assessment sheet used along with the log book should form the basis for certifying satisfactory completion of course of study, in addition to the attendance requirement.

Student Feedback form

Name of resident

Topic

Date

	poor	Average	Good	Very good
Understood the subject in depth				
Able to put the information to practice				
Speaker cleared all doubts				
Presentation was up to date				

Do you need further training-Yes/No

MODULES	TOTAL	1ST YEAR	2ND YEAR	3RD YEAR
PATIENT EVALUATION&MANAGEMENT	52			
PREOP ASSESSMENT	6	2	2	2
MANAGEMENT OF ANESTHESIA IN OR/OUTSIDE OR	15	5	5	5
INTERDEPT CONSULTATIONS	6	2	2	2
ICU MANGEMENT	10	3	3	4
INVASIVE SKILLS	10	3	3	4
ADVANCED AIRWAY MANAGEMENT	5			5
ANALYSIS&INTERPRETATION OF MONITORING	30			
EKG,X-RAYS	6	2	2	2
ECHO	6	2	2	2
TCD	6	2	2	2
EVOKEED POTENTIALS	6	2	2	2
EEG,BIS,ENTROPY	6	2	2	2
ACADEMIC PRESENTATION	40			
SEMINARS/SYMOSIUM	10	3	3	4
JOURNAL CLUB	10	3	3	4
PROBLEM ORIENTED CASE DISCUSSION	10	3	3	4
BEDSIDE CASE DISCUSSION	10	3	3	4
EVALUATION OF PROJECT WORK	20			
MANDATORY POSTINGS	18			
STATISTICS	5			
BIOTECHNOLOGY	3			
SUBMISSION OR PUBLICATION OF ONE PAPER	5			
PRESENTATION OF ONE PAPER IN CONFERENCE	5			
INTERNAL EVLUATION	30			
EXAM 1	6	6	NA	NA
EXAM 2	6	6	NA	NA
EXAM 3	6	NA	6	NA
EXAM 4	6	NA	6	NA
EXAM 5	6			6
OUTSTANDING CONTRIBUTION & AWARDS	5			
ADDITIONAL PAPER PUBLICATION	5			

