APPENDIX - I

SCHEME AND SYLLABUS OF EXAMINATION FOR THE PURPOSE OF FILLING UP THE POST OF *CONSULTANT* IN THE SIKKIM STATE HEALTH SERVICE:-

1. The examination will consist of 2 papers:-

PAPERS	SUBJECT	FULL MARKS	TIME ALLOWED
PAPER-I	General English & General Knowledge	100 MCQ/Conventional	2.00 hours
PAPER-II	Compulsory Subjects in their respective Specialist discipline	300 MCQ & Conventional	3.00 hours
VIVA-VOICE/Personality Test – 50 marks			

1. PAPER-I: GENERAL ENGLISH

The question will be designed to test the candidate's understanding and command of the English language. *Mode of Examination pattern shall be objective MCQ, Conventional/MCQ for both Paper-I, General English-General Knowledge and Paper-II (Compulsory Subjects in their respective Specialist discipline).*

English: Candidate will be required to answer questions designed to test their understanding of English and workman like use of words. The Patterns of questions would be broadly as follows:

(i) Comprehension & Grammar.
(ii) Letter Writing/Report Writing/ Project Writing.

General Knowledge: Knowledge of current events of local, National and International importance and of such matter of everyday observation and experience in their scientific aspects as may be expected of any educated person who has not made a special study of any scientific subject.

2. PAPER-II

The questions will be conventional & MCQ type and will cover areas of knowledge of the following subject and topics:-

CARDIAC-ANAESTHESIOLOGY — D M

Detailed Syllabus

I. BASIC SCIENCES

ANATOMY Cardiac : Embryology, development of heart, pulmonary and vascular anatomy, coronary artery anatomy

PHYSIOLOGY Cardiac : Cellular Physiology, Haemodynamics, Autonomic nervous system, Cardiac functions, Blood Physiology, Coagulation action potential, Cardiac arrhythmia

Pulmonary : Open & Closed chest ventilation. Ventilation/perfusion mismatch. Pulmonary airway mechanics, one lung ventilation. Thoracotomy and pulmonary physiology. Renal, Hepatic, CNS, Endocrinal System, others, metabolic effects of surgery. Endocrines response to anaesthesia and surgery

PATHOPHYSIOLOGY : Heart Failure, Congenital defects, COAD, Cardiopulmonary reserves, acquired cardiac & pulmonary diseases. Vascular pathology. Immunological response metabolic response during CPB

PHARMACOLOGY : Total circulatory arrest, Pharmaco Kinetics & Pharmacodynamics ofAnaesthetic and Vasoactive drugs Biochemical reactions, applied concepts. Drugs related to anaesthesia practice Cardiovascular drugs. Current antibiotics for ICU use bronchodilator. Antiarrhythmic drugs, nitric oxide

PHYSICS : Basic concepts, Analysing, measuring & monitoring devices, electronics, computing of patients data. Laser in cardiac surgery, robotic technique

Equipment: Computer application, Maintenance monitoring techniques, Equipment in OT, Equipment for transport of patients, ICU equipment

II. CLINICAL SCIENCES

Anaesthesia for Cardio-thoracic & Vascular Surgery:- or diagnostic procedures in adults &Paediatric age groups.

Anaesthesia for - Cardiac Surgery : For closed & Open heart surgery.

Vascular Surgery : Aortic surgery, cartoid artery surgery

PAEDIATRIC : Basic haemodynamics, palliative procedures, Pre-op. preparations & special care in monitoring, Fluid balance & airway management

- Anaesthesia for neonatal complex cardiac surgery
- Anaesthesia management for re-surgery
- Paediatric diagnostic procedures in Cath Lab & echocardiography
- Invasive therapeutic techniques like ASD devices, stent in major vessels, coil embolization

ADULT :

- Anaesthesia a for ischemic heart disease, valvular heart disease, vascular disease, adult congenital heart surgery
- Electrophysiological & Arrhythmia surgery. Heart transplant, heart lung transplant, ventilator assets devices
- Anaesthetic techniques for pulmonary surgery Diagnostic & elective. Emergency procedures for lung surgery. One - Lung anaesthesia, Ventilation, Physiotherapy (gas exchange & airway dynamics)
- Anaesthesia during emergency, surgery and direct emerging from cath lab after cath lab complication
- Anaesthesia in patients for diagnostic & palliative procedures in Cardiology, Radiology cath LAB (outside operative rooms).

Invasive
cardiology procedure

- Anaesthesia management of re-surgery
- Management for Post Op. ventilation care, prolonged ventilation, weaning, Control of Pain - its techniques & agents, used.
  Postoperative
  pain management
- Intra op. monitoring, PAC, Cardiac output coagulation monitoring

CARDIOPULMONARY BYPASS

Perfusion technology, principles, equipment, oxygenators, haemofiltration

Hypothermia, techniques & protocols

Myocardial Protection

Haemodilatution

Anticoagulation, Pharmacology, monitoring methods Side-

effects, complications & management

Subsystem care - cerebral, Renal Hepatic protection Cerebral protection, cerebral monitoring
Total circulatory arrest, left heart bypass

Anaesthesia management during CPB

Pharmacoakinetics& pharmacodynamics of drugs during CPB

INTENSIVE CARE MANAGEMENT

Protocols for sub-system care, cerebral, Renal, Hepatic & others

Ventilatory Care, weaning of Ventilatory support. Parenteral Nutrition, control of infection End

stage renal failure, bedside dialysis techniques

Postoperative management of single ventricular repair Hepatic

failure

ICU monitoring technique in postoperative pain management

ICU Management, especially after neonatal surgery – ventilatory support in neonates, ECMO programme for neonates and children

Intensive coronary care

Cerebral monitoring

III ALLIED SCIENCES

Cardiac Surgery	:	Surgical technique, curative surgery, Palliative procedures Risk evaluation, prognosis, Robotic surgery.
Cardiology and cardiac Radiology	:	Pre-op. evaluation, patho-physiology, Electrophysiology, Diagnostic Procedures-ECG, x-ray Angiography, Cardiac Cath, Doppler's. Echo-Cardiography, Nuclear studies & their interpretations & their Treatment of disease Special procedures : Pacing, Cardioversion, PTCA, etc. Automated cardioverters, invasive procedures for arrthmia i.e. ablation of abnormal pathway.
Biotechnology	:	Various mechanical & electronic equip. Animal experiments, materials used for CPB techniques, VAD. IABP, Laser for TMR, Ecmo
Statistics	:	Statistical technique
Hospital Administration	:	Sterilization/Gas supply, equipment maintenance

Monitoring in Anaesthesia

Invasive & Non-Invasive monitoring techniques for Pre-peri& Post-operative periods in cardiothoracic centre :

Understanding of basic concepts of monitoring

Indications, cost effectiveness, complications

Equipment usage & knowledge of accessories

Knowledge of the following monitoring —

Cardiac functions	: ECG, ABP, Vent. Pressures, Calculation of cardiac output, resistance, Flow, Echo, Dopplers& (CAT, PET, NMR)
Pulmonary functions	: PFT, Blood gases, Acid-basePulm. Airway mechanics.
Coagulation Profile	: Temp. renal, B. Sugar, Enzymes. ACT Heparin &Protomine regulation, thromboelastography.
Neuromuscular blockade	: And other Recent advances in monitoring. BIS cerebral oximetry, evoked potential monitoring, CNS monitoring during CPB.

RECENT ADVANCES

Knowledge of recent developments in field of Cardio thoracic &Vascular surgery

Cardiology - PTCA, Balloon emobolectomy etc.

Heart - lung transplant - physiology, pharmacology (Anaesthetic consideration) - Donor - recipient selection

Immunosupression etc.

Cardiac assisting devices - Artificial heart, IABP, LHAD

Advances Pulm.support - ECMO, H.F. Ventilation

Blood substitutes

Current advances and concepts in drugs, equipments, and monitoring methods

CARDIOLOGY — D M

BASIC SUBJECTS

Teaching and attaining proficiency in applied Anatomy (including developmental anatomy), Physiology and Pathology related to the cardiovascular system.

CLINICAL CARDIOLOGY

Etiopathology, hemodynamics, clinical evaluation, noninvasive and invasive evaluation and management strategies for the following disorders:

1. Coronary artery disease
2. Rheumatic heart disease
3. Congenital heart disease and other paediatric cardiac disorders
4. Pericardial diseases
5. Cardiac arrhythmias
6. Heart failure
7. Peripheral vascular disorders
8. Pulmonary thromboembolism and pulmonary hypertension
9. Systemic hypertension
10. Systemic diseases involving heart
11. Heart muscle diseases
12. Traumatic heart disease
13. Tumors of heart

Genetics, molecular biology and immunology related to cardiology

15. Geriatric heart disease
16. General anaesthesia and non cardiac surgery in patients with heart disease
17. Pregnancy and heart disease
18. Epidemiology and preventive cardiology

Non-invasive Technique

To perform and interpret various non invasive techniques including:

1. Electrocardiography
2. Radiography – routine and specialized areas like CT and MRI
3. Stress testing – tread mill test, stress related and other nuclear techniques
4. Holter monitoring for arrhythmias and ischemic disorders
5. Echocardiography – M-mode, Two dimensional, Doppler, color flow imaging, transesophageal echocardiography and echo directed hemodynamic studies.

Invasive Cardiology

Experience in cardiac catheterization to calculate and interpret various hemodynamic parameters Right and left heart cath and coronary angiography procedures in adults and children

To perform temporary pacemaker insertion.

To assist in various interventions including valvuloplasty, coronary and congenital interventions.

Electrophysiology: To interpret electrophysiological data and assist in electrophysiology procedures, permanent pacemaker implantation.

Biomedical Aspects

To understanding the functional principles of various bio-medical equipments used for the invasive and non invasive cardiology.

Research Projects

As of now each DM student is completing four research projects during the course.

I It is recommended that the number of projects be reduced to two, however at least one of these projects must be prospective in nature. In addition, one of the projects must be submitted for publication in an indexed journal before submission. Special credit should be given for additional published case reports, published articles.

II The candidate should write two reviews as the topics presented by him on seminars.

HEMATOLOGY — D M

CLINICAL HEMATOLOGY

COURSE CONTENT

Core Topics:

1. Introduction to clinical hematology.
2. Introduction to Laboratory hematology.
3. Allied specialty

    Nuclear Medicine.

    Biostatistics.

Subtopics:

1. Basic morphology and basic concepts of hematopoiesis.
2. Bone marrow structure and examination.
3. Red blood cells: Structure and function.
4. Laboratory approach to diagnosis of anemia.
5. Development of Immune system.
6. Overview of normal hemostatic mechanism.
7. Laboratory approach to diagnosis of bleeding disorders.
8. Clinical evaluation and management of inherited bleeding disorders.
9. Laboratory approach to diagnosis of leukemias.
10. Laboratory methods in hematology

a. Principles of automated cell counter and interpretation of results.

b. Hemoglobin electrophoresis.

c. HPLC use in hematology.

d. Special stains and cytochemistry.

e. Flow cytometry and its applications.

f. Diagnostic procedures for analyzing DNA.

11. Principles of Nuclear Medicine: and applications in hematology & oncology.
12. Biostatistics.

Core Topic: Disorders of Erythrocytes:

Subtopics:

1. Iron metabolism and iron deficiency anemia.
2. Megaloblasticanemia.
3. Red cell membrane defect: hereditary spherocytosis.
4. Red cell enzymopathies.
5. Thalassemia: (a) Clinical aspects and community screening (b) molecular genetics.
6. Sickle cell anemia.
7. Abnormal hemoglobins.

8. Immune hemolyticanemias.

Core topics: Disorders of white cells

Subtopics:

1. Cell Cycle and Carcinogenesis.
2. Principles of chemotherapy.
3. Quantitative defect of neutrophils.
4. Reactive lymphocytosis.
5. Introduction to acute leukemias.
6. Immunophenotype of acute leukemias.
7. Cytogenetics of acute leukemias.
8. Acute lymphoblastic leukemia in children.
9. Acute lymphoblastic leukemia in adults.
10. Acute myeloid leukemia.
11. Acute promyelocyticleukemia.
12. Minimal residual disease in acute leukemia.
13. MDR genes in Leukemia.
14. Chronic myeloid leukemia.
15. Chronic lymphocytic leukemia.
16. Hairy cell leukemia.
17. T cell lymphoproliferative disorders.
18. Bone marrow transplantation.
19. Disorders of spleen.

Core Topics: Disorders of Hemostasis and Thrombosis

Subtopics:

1. Laboratory diagnosis of platelet function defects.
2. Overview of megakaryopoiesis.
3. Quantitative platelet disorders.
4. Qualitative platelet disorders.
5. ITP.
6. TTP/HUS.
7. Hemophilia
   a. genetics; prenatal diagnosis.
   b. Laboratory diagnosis.

c. Special management issues.

8. Von Willebrand's disease

a. Laboratory diagnosis.

b. Management.

9. Dysfibrinogemias.

10. Other rare coagulation disorders.

11. Fibrinolysis and defects of fibrinolytic pathway.

12. Disseminated intravascular coagulation.

13. Lupus anticoagulant

a. Lab diagnosis.

b. Clinical presentation and management.

14. Acquired disorders of coagulation.

15. Hemostasis in the Newborn.

16. Bleeding disorders in the Newborn.

Core Topic:

1. Disorders of hemostasis and thrombosis.
2. Disorders of erythrocytes Part II.

Subtopics:

Part A

1. Pathophysiology of thrombosis.
2. Inherited thrombotic disorders.
3. Laboratory testing of prothrombotic state.
4. Thrombosis in adults: Management issues.
5. Pediatric issues in thrombosis.
6. Thrombosis and pregnancy.

Part B

1. Bone marrow failure syndrome

a. aplastic anemia.

b. Paroxysmal nocturnal hemoglobinuria.

2. Hematological manifestation syndrome disease.
3. Red cell disorders in pregnancy.
4. Red cell disorders in the newborn.
5. Polycythemia.
6. Infections and hematological problems.

Core Topic:

1. Disorders of white cells Part II.
2. Miscellaneous topics

a. Transfusion medicine.

b. Immuno hematology.

c. Consultative hematology.

d. Quality assurance program.

Subtopics:

Part A

1. Myelodysplastic syndrome.
2. Idiopathic myelofibrosis/essential thrombocythemia.
3. Non Hodgkin's lymphoma.
4. Hodgkin disease.
5. Plasma cell disorders.
6. Histiocytosis.

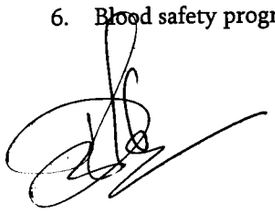
Part B

1. Infections and blood transfusions.
2. Complications of blood transfusion.
3. Hematological manifestation of HIV.
4. Consultative hematology

a. Obstetrics and Gynecology.

b. Surgery.

5. Blood and component therapy.
6. Blood safety program.



ENDOCRINOLOGY & METABOLISM— D M

SYLLABUS

A three years training period is designed to meet the minimum requirements for training in endocrinology prior to certification. Clinical Endocrinology should include:

1. Basic sciences as related to clinical endocrinology:
   Hormone receptors/receptor biology
   Genetics in Endocrinology
   Molecular biology
   Hormonal assays
2. Hypothalamic pituitary disorders
3. Thyroid disorders
4. Reproductive disorders
5. Bone and mineral disorders/Vitamin D metabolism
6. Adrenal disorders (Glucocorticoids/Mineralocorticoids, Adrenomedullary disorders)
7. Metabolic disorders (lipids, carbohydrates and protein metabolism related disorders)
8. Diabetes Mellitus
9. Disorder of growth and sexual differentiation

All the candidates will be involved in the direct care of the patients admitted to the endocrine services. This will include taking a complete history and performing a comprehensive examination. Additionally residents will be required to attend outpatient endocrine clinics where consultants will be available for on spot consultations.

Training in nuclear medicine will be coordinated with the department of nuclear medicine. The residents will be given training in principles of scanning of various endocrine organs and interretation of data. Additionally regular monthly conferences will be scheduled with the nuclear medicine department where faculty and the resident staff will go over interesting scans of the previous month.

TRAINING IN THE PATH LABORATORY

It is primarily aimed at providing trainee experience in the area of endocrine-pathology eg. Estimation/ quantitation of auto-antibodies, acquainting with techniques of florescent microscopy, principles of electron microscopy and histo-pathological identification of common pathological entities encountered in Endocrinology. Training in aspiration cytology will be arranged.

MOLECULAR BIOLOGY COURSES: (AS APPLIED TO ENDOCRINOLOGY)

It is mandatory to learn basics and acquaint with techniques. The course is devised in collaboration with faculty in the department of biotechnology.

MEDICAL STATISTICS

A 2 week course (15 hrs) in medical statistics is mandatory. This is to acquaint students with principles of statistics and analysis of data in currently accepted scientific way. The course will be organized in collaboration with department of biostatistics.

CLINICAL/LABORATORY RESEARCH

Minimum 6 months experience in the laboratories of endocrine department will be required. Candidateswill be required to complete 2 research projects related to clinical/experimental endocrinology during their stay. Faculty will supervise and help in completion of research protocols.

The details of curriculum are described in the following headings:

1. **Theory Syllabus**
2. **Clinical training**
3. **Surgical training**
4. **Academic activities.**
5. **Research and publication**
6. **Intra-departmental resident evaluation**
7. **Degree Qualifying Examination**

1. THEORY SYLLABUS

Each resident is expected to acquire a through theoretical knowledge of the organs of the GI tract as regards anatomy, physiology,pathology of various diseases congenital/acquired/traumatic vascular/ neoplastic and their detailed principles of management both medical and surgical. For the management of malignant diseases, the candidates are supposed to be acquainted with general oncological principles, various investigative approaches and different modalities of adjuvant treatment employed (e.g.chemotherapy, radiotherapy, immunotherapy etc.).

a. Oesophagus

Anatomical detail, physiology of swallowing, esophageal manometry, pilmonitoring, endoscopic ultrasound and other diagnostic techniques, brush cytology, vital staining, contrast imaging and CT scan, congenital lesions (TOF), Zenker's diverticulum, epiphrenic diverticulum, esophageal trauma, rupture-spontaneous or introgenic, corrosive burns- detection, evaluation and management, esophageal motility disorders, Gastro esophageal reflux disease, achalasia. Barrett's esophagus, esophageal cancer- adeno&suarmous, various esophageal operations-diverticuloctomy, excision of leimyoma, oesophagostomy, myotomy,

fundoplication, oesophageal resection (lyorLewsi,McKeown, Transhiastal). cervical exploration, oesophagogastrostomy, gastric pull-up, gastric and colonic bypass, complications of oesophagectomy, management of chylothorax.

b. Stomach and Duodenum

Anatomical details, physiology of gastric secretions, gastroduodenal motility, diaphrtagmatic hernia (congenital and acquired), volvulus, pyloric stenosis in children and adults, Foreign bodies (bezoars), stomach trauma, H.pylori in gastric diseases, peptic ulcer, Zollinger-Ellison syndrome, NUD, Gastric tumours, gastric surgery-vagotomy pyloric drainage, gastrojejunostomy, bariatric gastric tube creation, R-en-Y oesophagojejunal anastomosis, postgastrectomy syndromes and complications.

c. Biliary System

Detailed anatomy, bile physiology, enterohepatic circulation, acute cholocystitis, chronic cholecysititis, acalculuscholecystitis, gallstores-pathogenesis and presentation, CBD stones. CBD stricture, cholangitis, sphincter of Oddi (SOD) dysfunction and biliary dyskinesia, cholecystopathies, postchoecystectomy syndromes, choledochal cyst, polyps of GB, carcinoma of gall bladder, cholangiocarcinoma, parasitic infestations of biliary tree, cholecystectomy-open and laparoscopic, CBD exploration and drainage,biliary bypass radical cholecystectomy, choleduochal cyst excision, primary sclerosing cholangitis endoscopic biliary interventions and stenting hemobilia.

d. Liver

Segmental anatomy in detail, liver function and tests, liver regeneration, liver failure-diagnosis and management, liver abscess cysts, benign and malignant tumours (HOC,intrahepaticcholangiocarcinoma, hemangioma, FNH adenoma), cirrhosis, PBC, viral hepatitis, radiological imaging modalities (US, CECT, Lipiodol CT, Dynamic CT, MR imaging and radionuclide scnanning), percutaneous transhepatic biliary drainage and cholangiography. Liver biopsy, portal hypertension (cirrhotic and non-cirrhotic causes), hepatic venous outflow onstruction, Shunt surgery (Proximal lienorenal shunt, cavoatrial, mesocaval, portocaval-side to side), splenectomy and devascularisation, liver resecting-anatomic and non-anatomic, liver trauma, hepaticojejunostomy, seg III bypass, Orthotopic liver transplantation, liver related transplantation, Caroli's disease, hemobilia.

e. Pancreas

Anatomy, physiology, pancreatic ductal anomalites, acute pancreatitis, chronic pancreatitis-calcific, tropical and alcoholic; endocrine tumours, exocrine tumours of pancreas, cystic neoplasms; pseudocysts of pancreas, haemosuccuspancreaticus; pancreatic operations : pancreatic nerosectomy, pseudocystogastrostomy/jejunostomy, pylorus preserving pancreatoduodenectomy, duodenum preserving pancreatic head resections (Frey's, Beger's), distal pancreatectomy, regional pancreatectomy, total pancreatectomy, lateral pancreaticojeunostomy, Whipple's, pancreatic transplantation.

f. Peritoneum, Omentum, Retroperitoneum

Recesses, reflections, subdiaphragamaticspaces,peritonitis primary secondary and tertiary, tuberculosis, mesenteric cyst, pseudomyxomaperitonei, ascites (diag. invest and management), retroperitoneal tumours, inguinal hernia, ventral hernias, peritoneoscopy.

g. Spleen

Anatomy, splenic function, haemolyticanaemias,splenomegalyhypersplenism, splenic trauma, cysts and granulomas, physiological effects of splenectomy, OPSI, splenic vein thrombosis, splenic artery aneurysms, splenectomy, splenic preservation.

h. Small Intestine

Mesenteric vascular anatomy, intestinal physiology, Ladd's band, malrotation, volvulus, hernia, intestinal obstruction, ileocaecal TB, lymphoma,tumours of small intestine, Meckel's diverticulum, intussusception, small bowel gangrene, intestinal resections, lengthening and transplantation, mesenteric ischaemia, short gut syndrome, small bowel fistulae, Crohn's and other inflammatory bowel diseases enternal feeding, home/parenteral nutrition.

i. Colon, Rectum and Anal Canal

Anatomy, physiology.colonic motility, physiology of defaecation and anal continence; Hirschsprung's disease, anorectal malformations, rectal prolapse, SRUS, pseudoobstruction (Ogilvia syndrome), descending perineum syndrome, anismus and constipation,anal incontinence; haemorrhoids, fissue, fistulae and anal stricture; polyps and other benign tumours-hereditary and familial polyposis syndrome, ulcerative colitis and Crohn'sameobic colitis, ischaemic colitis, diverticulitis.lower GI haemorrhage, carcinoma of the colon, rectum, anal canal; Operations-APR, anterior resections, segmental coletomies, pelvic exenterations, colostomy, ureterosimoidostomy, hemicolectomies, urinary diversions, surgery for anal incontinence, rectal prolapse and complex fistulae, restorative proctocolectomy and ileoanal pouch anastomosis.

j. General Topics

Tumour genetics-oncogenes, tumor markers, systemic inflammatory. Response syndrome (SIRS), multiple organ dysfunction syndrome (MODS), immunology in relation to transplantation and rejection, intensive care and respiratory support, surgical nutrition- parenteral and enteral, iatrogenic complications of surgery like enterocutaneous fistulae, biliary strictures,intrabdominal sepsis/collections, AIDS, hepatitis and surgeons, renal failure, shock, disorders of coagulation,biostatistics, research methodology and surgical audit.

SYLLABUS

At this level of training, insistence of a syllabus may not be appropriate. Trainees should acquire an overall knowledge in Gastroenterology by reading standard textbooks, monographs and peer reviewed journals dealing with Gastroenterology, Hepatology, Pancreatology and related Basic Sciences and Epidemiology. A core syllabus is however, recommended as under, but it does not purport to be either comprehensive or restrictive. Furthermore, it is likely to change from time to time.

Recommended Core Syllabus

Basic Sciences

1. Immune system of the gastrointestinal tract (GIT) and its importance in various GI disorders
2. Molecular biology in relation to GIT
3. Genetic diseases of the GIT and the liver
4. Gene therapy
5. GI tumors and tumor biology
6. Gastrointestinal hormones in health and diseases
7. Embryology of the gut, liver, pancreas and congenital anomalies

Miscellaneous

1. Upper and lower gastro-intestinal bleeding
2. Gastrointestinal tuberculosis
3. HIV and the GIT, hepatobiliary and pancreatic systems
4. GIT and liver in systemic diseases
5. Cutaneous manifestations of GI diseases
6. Vascular diseases of the GIT
7. Gastrointestinal side effects of drugs especially NSAIDs
8. Gastro-intestinal symptoms physiology and interpretation Nausea, vomitingPain abdomen Diarrhoea Constipation Dysphagia Jaundice

Esophagus

1. Basic anatomy, histology and physiology
2. Congenital anomalies
3. Motility of the esophagus and motor disorders
4. Mechanism of deglutition and dysphasia
5. Approach to a patient with dysphasia
6. Gastro-esophageal reflux disease
7. Tumors of the esophagus
8. Esophageal webs, membranes and diverticulum
9. Management of benign and malignant esophageal strictures
10. Esophagus and systemic diseases
11. Infectious diseases of the esophagus
12. Foreign bodies in the esophagus and stomach
13. Esophageal perforation
14. Drug induced esophagitis

Stomach

1. Anatomy, histology, functions
2. Physiology of acid and bicarbonate secretion in health and diseases
3. Defence mechanisms against acid and pepsin
4. Gastroduodenal motor function in health and diseases.
5. Gastritis (nonspecific and specific)
6. Helicobacter pylori infection
7. Peptic ulcer
8. Dyspepsia
9. Stress and stomach
10. Gastric hypersecretory states including Zollinger Ellison syndrome
11. Ulcer complications and their management
12. Surgery for peptic ulcer
13. Post gastrectomy complication
14. Bezoars
15. Tumors of the stomach
16. Diverticuli and hernia of the stomach

Small Intestine

1. Anatomy, blood supply, histology
2. Motility of the small intestine
3. Congenital anomalies
4. Normal absorption of the nutrients
5. Intestinal electrolyte absorption and secretion
6. Malabsorption syndromes
   Pathophysiology, manifestations and approach
7. Celiac sprue
8. Infection related diseases

a. Intestinal microflora in health and diseases
b. Tropical sprue
c. Whipple's disease
d. Infectious diarrhoea and food poisoning
e. Parasitic diseases

9. Small intestinal ulcers
10. Short bowel syndrome and intestinal transplantation.
11. Eosinophilic gastroenteritis
12. Food allergies
13. Intestinal obstruction and pseudo-obstruction
14. Short bowel syndrome
15. Acute appendicitis
16. Malrotation of the gut
17. Bezoars
18. Management of diarrhoea
19. GI lymphomas
20. Small intestinal tumors
21. Small intestinal transplantation

Colon

1. Basic anatomy blood supply, histology and functions
2. Motility of the colon and disorders of motility
3. Congenital anomalies
4. Megacolon
5. Constipation
6. Colonic pseudo-obstruction
7. Fecal incontinence
8. Antibiotic associated diarrhoea
9. Inflammatory bowel disease

a. Ulcerative colitis

b. Crohn's disease

c. Indeterminate colitis

d. Ileostomies and its management

10. Diverticular disease of the colon
11. Radiation entero-colitis
12. Colonic polyps and polyposis syndromes
13. Malignant diseases of the colon
14. Other inflammatory diseases of colon including

a. Solitary rectal ulcer syndrome

b. Diversion colitis

c. Collagenous and microscopic colitis

d. Non specific ulcerations of the colon

e. Malakoplakia

f. Pneumatoses cystoids intestinalis

15. Hemorrhoids
16. Diseases of the anorectum

Pancreas

1. Anatomy, physiology, blood supply, developmental anomalies
2. Physiology of the pancreatic secretion
3. Pancreatic function tests
4. Acute pancreatitis
5. Recurrent acute pancreatitis
6. Chronic pancreatitis
7. Malignancies of the pancreas(Exocrine and endocrine)
8. Cystic fibrosis and other childhood disorders of the pancreas
9. Hereditary pancreatitis
10. Pancreatic transplantation

Biliary Tree

1. Anatomy, Physiology
2. Physiology of bile formation and excretion
3. Enterohepatic circulation
4. Bilirubin metabolism.
5. Approach to a patients with jaundice
6. Gallstones, its complications, and management
7. Acute acalculouscholecystitis
8. Miscellaneous disorders of the gallbladder

9. Acute cholangitis
10. Benign biliary structure
11. Benign and malignant neoplasms of the biliary system.
12. Endoscopic management of biliary obstruction.
13. Motility and dysmotility of the biliary system and sphincter of Oddi dysfunction
14. Congenital diseases of the biliary systems

Liver

1. Anatomy, physiology, blood supply
2. Functions of the liver
3. Microcirculation of liver
4. Liver function tests
5. Portal hypertension

i. Extrahepaticportosplenic vein obstruction
ii. Non cirrhotic portal fibrosis
iii. Cirrhosis

6. Acute viral hepatitis
7. Chronic hepatitis
8. Fulminant hepatic failure
9. Subacute hepatic failure
10. Cirrhosis of liver
11. Ascites
12. Hepatorenal syndrome
13. Autoimmune liver disease
14. Metabolic liver disease
15. Sclerosing cholangitis- primary and secondary
16. Primary biliary cirrhosis
17. Hepatic venous outflow tract obstruction
18. Fibrocystic diseases of the liver
19. Wilson's disease
20. Hemochromatosis
21. Liver in porphyria
22. Hepatic tumors
23. Infections of the liver
24. Liver in pregnancy
25. Liver in congestive heart failure
26. Liver biopsy
27. Liver transplantation and artificial liver support

Peritorium and Retroperitoneum

1. Ascites
2. Chronic peritonitis
3. Budd-Chiari syndrome
4. Malignant ascites
5. Diseases of the retroperitoneum

Nutrition

1. Normal nutritional requirements
2. Assessment of nutritional status
3. Protein energy malnutrition
4. Manifestations and management of nutritional deficiency and excess
5. Nutritional support in various GI disorders (malabsorption, acute and chronic pancreatitis, inflammatory bowel disease)

Vascular Diseases of the GI Tract

GI Radiology

Reading and interpreting the common x-ray films including

X-ray films of the abdomen

Barium studies, ultrasound examination

CT scans, MR scans and angiography and ERCP films

GI Pathology

Reading and interpreting histological slides of common gastrointestinal and liver diseases.

Endoscopic Training

Endosocpic training is an integral part of training in superspecialty of gastroenterology. A trainee is supposed to have knowledge of instruments and its applicatioin.

i. Endoscopes
ii. Accessories
iii. Sterilization of endoscopes and accessories
iv. Electrosurgical instrument
v. Keeping of endoscopes and accessories

HEMATOLOGY — D M
HEMATO-PATH

COURSE CONTENT

Core Topics:

1. Introduction to clinical hematology.
2. Introduction to Laboratory hematology.
3. Allied specialty

    Nuclear Medicine.

    Biostatistics.

Subtopics:

1. Basic morphology and basic concepts of hematopoiesis.
2. Bone marrow structure and examination.
3. Red blood cells: Structure and function.
4. Laboratory approach to diagnosis of anemia.
5. Development of Immune system.
6. Overview of normal hemostatic mechanism.
7. Laboratory approach to diagnosis of bleeding disorders.
8. Clinical evaluation and management of inherited bleeding disorders.
9. Laboratory approach to diagnosis of leukemias.
10. Laboratory methods in hematology

a. Principles of automated cell counter and interpretation of results.

b. Hemoglobin electrophoresis.

c. HPLC use in hematology.

d. Special stains and cytochemistry.

e. flowcytometry and its applications.

f. Diagnostic procedures for analyzing DNA.

11. Principles of Nuclear Medicine: and applications in hematology & oncology.
12. Biostatistics.

Core Topic: Disorders of Erythrocytes

Subtopics:

1. Iron metabolism and iron deficiency anemia.
2. Megaloblastic anemia.
3. Red cell membrane defect: hereditary spherocytosis.
4. Red cell enzymopathies.
5. Thalassemia: (a) clinical aspects and screening (b) molecular genetics.
6. Sickle cell anemia.
7. Abnormal hemoglobins.
8. Immune hemolytic anemias.

Core topics: Disorders of white cells

Subtopics:

1. Cell Cycle and Carcinogenesis.
2. Principles of chemotherapy.
3. Quantitative defect of neutrophils.
4. Reactive lymphocytosis.
5. Introduction to acute leukemias.

6. Immunophenotype of acute leukemias.
7. Cytogenetics of acute leukemias.
8. Acute lymphoblastic leukemia in children.
9. Acute lymphoblastic leukemia in adults.
10. Acute myeloid leukemia.
11. Acute promyelocytic leukemia.
12. Minimal residual disease in acute leukemia.
13. MDR genes in Leukemia.
14. Chronic myeloid leukemia.
15. Chronic lymphocytic leukemia.
16. Hairy cell leukemia.
17. T cell lymphoproliferative disorders.
18. Bone marrow transplantation.
19. Disorders of spleen.

Core Topics: Disorders of Hemostasis and Thrombosis

Subtopics:

1. Laboratory diagnosis of platelet function defects.
2. Overview of megakaryopoiesis.
3. Quantitative platelet disorders.
4. Qualitative platelet disorders.
5. ITP.
6. TTP/HUS.
7. Hemophilia
   a. genetics; prenatal diagnosis.
   b. Laboratory diagnosis.
   c. Special management issues.
8. Von Willebrand's disease
   a. Laboratory diagnosis.
   b. Management.
9. Dysfibrinogenemias.
10. Other rare coagulation disorders.
11. Fibrinolysis and defects of fibrinolytic pathway.
12. Disseminated intravascular coagulation.
13. Lupus anticoagulant
    a. Lab diagnosis.
    b. Clinical presentation and management.
14. Acquired disorders of coagulation.
15. Hemostasis in the Newborn.
16. Bleeding disorders in the Newborn.

Core Topic:

1. Disorders of hemostasis and thrombosis.
2. Disorders of erythrocytes Part II.

Subtopics:

Part A

1. Pathophysiology of thrombosis.
2. Inherited thrombotic disorders.
3. Laboratory testing of prothrombotic state.
4. Thrombosis in adults: Management issues.
5. Pediatric issues in thrombosis.
6. Thrombosis and pregnancy.

Part B

1. Bone marrow failure syndrome aplastic anemia.
   Paroxysmal nocturnal hemoglobinuria.
2. Hematological manifestation syndrome disease.
3. Red cell disorders in pregnancy.
4. Red cell disorders in the newborn.
5. Polycythemia.
6. Infections and hematological problems.

Core Topic

1. Disorders of white cells Part II.
2. Miscellaneous topics
   a. Transfusion medicine.
   b. Immuno hematology.
   c. Consultative hematology.
   d. Quality assurance program.

Subtopics

Part A

1. Myelodysplastic syndrome.
2. Idiopathic myelofibrosis/essential thrombocythemia.
3. Non Hodgkin's lymphoma.
4. Hodgkin disease.
5. Plasma cell disorders.
6. Histiocytosis.

Part B

1. Infections and blood transfusions.
2. Complications of blood transfusion.
3. Hematological manifestation of HIV.
4. Consultative hematology
   a. Obstetrics and Gynecology.
   b. Surgery.
5. Blood and component therapy.
6. Blood safety programme.

MEDICAL ONCOLOGY — D M

SYLLABUS

Paper I (Basic Science in Oncology)

1. Cell cycle
2. Pathology, Invasion &Metasssssstasis
3. Etiology of Cancer

a. Viral

b. Chemotherapy

c. Physical

d. Hormonal

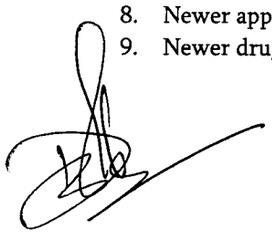
4. Epidemiology of Cancer
5. Principles of Cancer Management – Surgical Oncology, Radiation Therapy, Chemotherapy, Biologic therapy
6. Pharmacology of Cancer Chemotherapy
7. Clinical trials in cancer
8. Cancer prevention Tobacco related cancer, Diet & Risk reduction Chemopreventive Agents, Hormones
9. Caner Screening
10. Imaging Techniques of Cancer Diagnosis & Management
11. Specialized techniques of Cancer Diagnosis and Management
12. Vascular Access and Specialised Technique of drug delivery

Paper – II Clinical Oncology (Medical)

1. Cancer of Head and Neck
2. Cancer of Lung and Mediastinun
3. Cancer of Gastro Intestinal Track
4. Cancer of Genito Urinary System
5. Cancer of the Breast
6. Cancer of Endocrine System
7. Sarcomas of Soft Tissues & Bone
8. Benign & Malignant Mesotheliomas
9. Cancer of skin
10. Malignant Melanoma
11. Neoplasms of CNS
12. Cancers of childhood
13. Lymphomas
14. Leukemias and other Haematological Malignancies
15. ParaneoplasticSynddromes
16. Cancers of unknown primary site
17. A.I.D.S – related malignancies
18. Oncological Emergencies
19. Treatmetn of Metastatic Cancers
20. Gynaecological Cancers
21. High Dose Chemotherapy & Transplantation

Paper – III (Recent Advances in Oncology)

1. Essentials of Molecular Biology
2. Molecular Biology of Cancer: OnccogenesCytogenetics
3. Bone Marrow dysfunction in cancer patient
4. Infections in cancer Patients and neutropenic patients
5. Adverse effects of treatment
6. Supportive Care and Quality of Life
7. Rehabilitation of Cancer Patient
8. Newer approaches in caner treatment
9. Newer drugs in cancer treatment



NEONATOLOGY — D M

Contents For D M Neonatology Course

A. BASIC SCIENCES

Basic genetics

Fetal and neonatal immunology

Mechanism of disease

Applied anatomy and embryology Feto-

placental physiology

Neonatal adaptation

Development and maturation of lungs, respiratory control, lung functions, ventilation, gas exchange, ventilation perfusion

Physiology and development of cardiovascular system, developmental defects, physiology and hemodynamics of congenital heart disease

Fetal and intrauterine growth.

Development and maturation of nervous system, cerebral blood flow, blood brain barrier. Fetal

and neonatal endocrine physiology

Developmental pharmacology

Developmental hematology, bilirubin metabolism Renal

physiology

Physiology of gastrointestinal tract, digestion, absorption.

Electrolyte balance

Metabolic pathways pertaining to glucose, calcium and magnesium Biochemical basis of inborn errors of metabolism

B. GENERAL TOPICS

Research methodology

Biostatistics

Ethics in perinatology/neonatology

Principles of education (objectives, curriculum, assessment and use of media)

Computer, informations technology, internet

C. PERINATOLOGY

High risk pregnancy: detection, monitoring and management

Fetal monitoring, clinical, electronic; invasive, and non-invasive

Intrapartum monitoring and procedures

Assessment of fetal risk, and decision for termination of pregnancy Diagnosis

and management of fetal diseases

Medical diseases affecting pregnancy and fetus, psychological and ethical considerations Fetal interventions

Fetal origin of adult disease

D. NEONATAL RESUSCITATION E. NEONATAL VENTILATION

F. BLOOD GAS AND ACID BASE DISORDERS

G. NEONATAL ASSESSMENT AND FOLLOW UP

Assessment of gestation, neonatal behaviour, neonatal reflexes

Developmental assessment, detection of neuromotor delay, stimulation techniques

Immunization

H. BODY SYSTEMS

i) RESPIRATORY SYSTEM

Neonatal airways: physiology, pathology; management

Pulmonary diseases: Hyaline membrane disease, transient tachypnea, aspiration pneumonia, pulmonary air leak sysndromes, pulmonary hemorrhage, developmental defects

Oxygen therapy and its monitoring

Pulmonary infections

Miscellaneous pulmonary disorders

ii) Cardiovascular system

Fetal circulation, transition from fetal to neonatal physiology

Examination and interpretation of cardiovascular signs and symptoms Special

tests and procedures (Echocardiography, angiography)

Diagnosis and management of congenital heart diseases Rhythm

disturbances

Hypertension in neonates

Shock: pathophysiology, monitoring, management.

iii) Gastrointestinal system

Disorders of liver and biliary system.

Bilirubin metabolism

Neonatal jaundice: diagnosis, monitoring, management, phototherapy, exchange transfusion

Prolonged hyperbilirubinemia

Kernicterus

Congenital malformations

Necrotisingenterocolitis

iv) Nutrition

Fetal nutrition

Physiology of lactation Breast

feeding

Lactation management, breast milk banking, maternal medications and nursing

Parenteral nutrition

Vitamins and micronutrients in newborn health

v) Renal system

Developmental disorders Renal

functions

Fluid and electrolyte management

Acute renal failure (diagnosis, monitoring, management)

vi) Endocrine and metabolism

Glucose metabolism, hypoglycemia, hyperglycemia Calcium

disorders

Magnesium disorders Thyroid

disorders

Adernal disorders

Ambiguous genitalia

Inborn errors of metabolism

vii) ***Hematology***

Physiology Anemia

Polycythemia

Bleeding and coagulation disorders Rh hemolytic disease

viii) ***Neurology***

Clinical neurological assessment EEG, ultrasonography, CT scan Neonatal seizures

Intracranial hemorrhage Brain imaging

Hypoxic ischemic encephalopathy Neuro-muscular disorders

Degenerative diseases CNS malformation

ix) ***Surgery and orthopedics***

Diagnosis of neonatal surgical conditions Pre and post operative care

Neonatal anesthesia

Metabolic changes during anesthesia and surgery Orthopedic problems

x) ***Neonatal infections***

Intrauterine infections

Superficial infections Diarrhea

Septicemia

Meningitis

Osteomyelitis and arthritis

Pneumonias

Perinatal HIV

Miscellaneous infective disorders including HBV and condidemia

xi) ***Neonatal imaging***

X-rays, ultrasound, MRI, CT Scan etc.

xii)Neonatal ophthalmology

Developmental aspects

Retinopathy of prematurity

Sequelae of perinatal infections

xii)Neonatal dermatology

I. TRANSPORT OF NEONATES

K. NEONATAL PROCEDURES

K. DEVELOPMENTAL ASSESSMENT AND FOLLOW UP

xix) Organization of neonatal care

Community neonatology

Vital statistics, health system;

Causes of neonatal, perinatal death

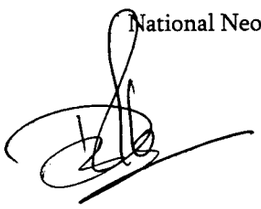
Neonatal care priorities

Care at secondary level of care Care at primary health centre

Role of different health functionaries

National programmes

National Neonatology Forum



NEPHROLOGY — D M

SYLLABUS

Applied basic sciences knowledge relevant to the field of nephrology including electrolyte and acid base disorders.

Investigative techniques, selection and interpretation of results

Pathogenesis of renal diseases and renal histopathology

Diseases of the urinary react (glomerular diseases urinary tract infection, tubulointerstitial diseases, inherited diseases, toxic nephropathies, systemic diseases with renal involvement, renal stone disease, urinary tract obstruction, vascular diseases of kidney, hypertension, neolasiaetc)

Renal failure (diagnosis and medical management)

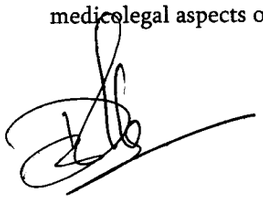
Principles and practice of dialysis

Renal transplantation

Recent advances in nephrology

Biostatistics and clinical epidemiology

Ethics, psychosocial, economics of management of renal diseases, human organ transplant act and medicolegal aspects of transplantation.



NEURO-ANAESTHESIOLOGY — D M

BASIC SCIENCES AND PRINCIPLES OF NEURO-ANAESTHESIA, NEUROINTENSIVE CARE AND PAIN MANAGEMENT

i) **Anatomy** - Gross and applied anatomy of the central and autonomic nervous system.

ii) **Physiology** - This would include brain, spinal cord cerebrospinal fluid, cerebral blood flow,mechanism of transmission of pain in different acute and chronic pain conditions, cardio-respiratory physiology in patients with neurologic and neurosurgical diseases, and endocrine function of the pituitary and pineal gland. Revision of cardiovascular, respiratory and neuro muscular functions.

iii) **Pharmacology** - This would include drugs affecting the functions of brain, spinal cord, CSF andcerebral blood flow and action of drugs on transmission of different stimuli, including pain, and pharmacology of drugs used in neuro intensive care for management of both cardio-respiratory dysfunctions and brain protection.

iv) **Monitoring** - This would include indication, technique and inter- pretation of different types ofmonitoring dences.

v) **Fluid-electrolyte and acid** - Base disturbance in general with special emphasis on neurosurgicaland neurological patients including patients with stroke, subarachnoid haemorrhage, patients with acid-base disturbances. Management of fluid and electrolytes therapy in Diabetes insipidus and SIADH and various nephrologic disorders.

vi) **Temperature regulation** - In paediatric neurosurgical/neurologi-cal patients and use ofhypothermia in head injured patients and during surgery.

vii) **Nutritional considerations** - in neurosurgical and neurological patients requiring prolonged intensivecare management. Evaluation of nutrition and complications of these therapy.

viii) **Principle of airway management** - The type of airway the patient requires, when to intubate,how to maintain the patency of airway for a long period, when to extubate, indications management and complication of tracheostomy.

ix) **Principles of ventilatory therapy** - What type of ventilation the patient requires, care of thepatient during ventilatory care, prevention and treatment of complications during ventilatory therapy, when and how to wean the patients from ventilator.

x) **Principles of cardiac support** - Care of the arterial pressure, treatment of arrhythmia, managementof different types of heart failure and treatment of cardiac arrest.

xi) **Basic guideline for establishing Neuro ICU** - Arrangement of beds, monitoring systems,airconditioning, its administration aspects and infection control.

CLINICAL ASPECTS OF NEUROANAESTHESIA, INTENSIVE CARE AND PAIN MANAGEMENT

i) Anaesthetic problems related to raised intracranial pressure either due to space-occupying lesions or due to hydrocephalus. Anaesthetic and post-operative management of such patients.

ii) Perioperative anaesthetic problems of pituitary tumours,craniopharyn-gioma and other endocrine disorders of neuro-surgical origin. Management of patients with pituitary apoplexy, hypothalamic disorders, diabetes insipidus and SIADH.

iii) Anaesthetic management of vascular tumours like meningiomas, aneurysms and arteriovenous malformations. Control of haemodynamic responses, control of ICP, care during excessive bleeding and care of patients in presence of ischaemia.

iv) Management of patients undergoing cervical spine surgery.

v) Paediatricanaesthesia – Congenital hydrocephalus, encephalocele, meningomyelocele, craniosynostosis and other congenial deformities and brain tumours.

vi) Anaesthetic management of posterior fossa lesions, like midline tumours, C-P-angle tumours, meningioma. The challenges of different abnormal positions like (prone, park bench and sitting).

vii) Anaesthetic management of patients with head trauma and polytrauma patients. Management of these patients with full stomach cervical spine and chest injury.

viii) Neuroradiological procedures – Anaesthesia for myelogram, angiogram, intervention neuroradiology and MRI.

ix) Intensive care of post operative neurosurgical patients like head injury, C-P- angle tumour, vascular lesions and patients who deteriorated during the postoperative period. Intensive care of neurological patients like, myasthenia gravis, ascending polyneurits, encephalitis, stroke, status epilepticus etc.

x) Infection control in neuro ICU and neuro operation theatre, sterilization of anaestheticequipments,

xi) Management of patients with trigeminal neuralgia, causalgia, myofascial pain and cancer pains.

xii) Assessment for brain death.

RECENT ADVANCES AND EMERGENCY MANAGEMENT

i) Emergency management of patients with raised intracranial pressure, head injured patients and patients with polytrauma.

ii) Management of patients with haemorrhagic shock, airway problems and ventilatory failure.

iii) Management of patients with stroke, myasthenic crisis or cholinergic crisis and other neurologic diseases with cardio-respiratory distress or failure.

iv) Barbiturate or diazepam coma for patients with status epilepticus or management of patients with malignant intracranial hypertension.

v) Hypotensive anaesthetic techniques to control excessive blod loss and at the same time preserve the neurologic functions.

vi) Hypothermia and cardio-pulmonary bypass for patients with giant aneurysm.

vii) Institution and management of hypothermia to control increased intracranial pressure in patients with head injury.

viii) Brain protective measures during management of patients with subarachnoid haemorrhage or during and following aneurysmal clipping.

ix) Role of different therapeutic modalities like exchange transfusion or plasmapheresis for treatment of patients with myasthenia or polyneuritis.

x) Detailed knowledge on evoked potentials, extracranialdoppler, ultra-sound, cerebral blood flow measurement techniques and newer methods of imaging to assess brain functions e.g. PET scan.

xi) Anaesthesia for awake craniotomies for patients with epilepsy.

xii) Anaesthetic management of patients with extensive skull base surgery.

xiii) Pre-op, intra-op and post-operative care of patients with carotid artery stenosis for carotid endarterectomy.

xiv) Indication and technique of selective neurectomy or cordotomy for intractable pain of any origin.

NEUROLOGY — D M

TEACHING METHODS :During the period of training the candidates follow in-service training-cum-residency programme. He/ she works as a Senior Resident and is given gradually increasing responsibility in decision makingprocess in the clinical and investigative aspects of Neurology and its allied specialties such as Neuroanatomy, Neuropschiatry, Neuropathology, Neurophysiology, Neurochemistry, Neuroradiology Neuroanaesthesiology, Neurorehabilitation and Neurosurgery.

The day-to-day work of the trainees is supervised by the Consultants of the department of Neurology. The posting is so organized that the trainee gets posted in various areas of the department like OPD, wards, laboratories etc. He/She participates in the consultation service provided by the department to the Institute.

Besides in-service activities a pragramme of bedside demonstrations, seminars, tutorials, group discussion, workshops, journal clubs and lectures is also organized.

TEACHING PROGRAMME

The following teaching schedule is prescribed for the course:

The Outpatient service	- 3 days a week
Major ward rounds	- 3 days a week
D M Seminars	- Once a week
Journal club	- Once a week
Neuroradiology (teaching session)	- Once a week
EEG/EMG etc.	- Once a week

Teaching of M D Medicine, Psychiatry, Physiology, Rehabilitation Medicine & Pediatrics Residents by the D M students if available, is part of the training.

Neurosurgery

During the Neurosurgery posting which is for one month, the candidate is required to attend all the operations and see for himself/herself, the surgical techniques. Postoperative care and complications and selection of cases for surgery are also taught.

Neuroradiology

The trainee is made conversant with the technique and interpretation of carotid/vertebral angiography, pneumoencephalography, Myelography, CT scan and MRI scan. All these investigations are taught under the guidance of a neuroradiologist during one month. Neuroradiology investigations are conducted every day in the Radiology Department.

1. Regular Neuroradiology posting - 1 month
2. Weekly sessions - once a week

Neuropathology

Brain cutting sessions are held once a week. During the one month posting in the Neuropathology, the candidate is imparted training in special staining procedures and interpretations of the histopathological sections.

Neurophysiology

The resident is imparted training in the technique of application of EEG/EMG/evoked response electrodes. He/She learns to detect various types of artifacts in the EEG and evoked response results. He also learns the handling of EEG/EMG and evoked response machines, under the guidance of technical assistant and the consultants. During the first year of the course, training is imparted in the interpretations of nerve conduction studies, EMG, evoked response and ultrasound studies. He/she is taught the interpretation of EEG records and reports under the guidance of senior colleagues and consultants in the beginning and independently in the second year of training.

The trainee is made well conversant with each and every aspect of known knowledge about Neuroanatomy, Neurophysiology, Neurochemistry, Neuroradiology, Neuropharmacology and Applied Neurology by the end of two year training. Related neuropathology and neurosurgery is also taught through bedsides, teaching rounds lectures, seminars and group discussions.

Neuropsychiatry

One month posting in the Psychiatry department.

PERIOD OF POSTINGS IN VARIOUS UNITS, DIVISION/ DEPARTMENTS

The trainee will be posted in different specialities as follows:

Neurology	- 2 yrs.
Clinical Neurophysiology	- 4 months
Neurosurgery	- 1 month
Neuropathology	- 1 month
Neuroradiology	- 1 month
Neuropsychiatry	- 1 month
Research Exp.	- 1 month (optional)
Neuro. Anaesthesiology	- 15 days
Elective posting	- 2½ months

ASSESSMENT

Regular two internal assessment both in theory and clinical should be made for every candidate. Internal assessment will be made in day-to-day work of the trainee who involves patients'care, learning bedside case presentation and research.

Research

The trainee shall be required to undertake research and write papers under the guidance of consultants.

The candidates will have to submit a proposal/topic for project work within three months of the joining of the course. The work period for the project will for 1½ – 2 years. Papers from the project should be accepted for publication in an indexed journal. Another article as the first author should also besubmitted for publication in an indexed journal before the candidate appears in the final D.M. Neurology Examination.

The candidate whose project/research work has not been accepted may be permitted to re-submit within not less than 6 months and not more than one year after rejection.

FINAL EXAMINATION

Eligibility: The candidate will be allowed to appear after three years of training.

Board of examiners: Neurologists with minimum of 8 years of teaching experience in the specialty.

Theory papers: There shall be three theory papers with the following titles:

1. Basic sciences as related to Neurology
2. Clinical Neurology
3. Investigative and recent advances in Neurology

Clinical, Practical and viva voce: One long case and two short cases are given to the candidates and the discussion thereon lasts 30-40 minutes in each case. Additional spots/cases also may be shown. The candidates are also given EEG, pathology specimens, histology slides and X-rays to be interpreted. Viva is also held. Two examinations are held each year in the months of May and December. The examination should last for 2 days.

NEUROLOGY CURRICULUM

a) Every institution undertaking post-graduate training programme shall set up a curriculum Committee under the Chairmanship of the HOD, which shall work out the details of the training programme in their department in consultation with other departmental faculty staff and also co-ordinate and monitor the implementation of this programme. The training programme shall be updated as and when required.

b) Post-graduate students shall maintain a Log Book of the work assigned to them.

NEURO-RADIOLOGY — D M

SYLLABUS

Part - I

Basic Sciences:

1. *Anatomy*

a) Embryology of the brain, spinal cord and their vascular system including to aorta and brachiocephalic vessels.

b) Basic and correlative anatomy of brain, spinal cord, cranial nerves, peripheral nervous system and pathways for special senses.

c) Blood supply of the brain and spinal cord with special reference to functional vascular anatomy.

d) Embryology and anatomy of skull, face, head and neck

e) Anatomy of musculoskeletal system relevant to diseases of nervous system & head & neck.

2. *Physiology*

a) Basic concepts and applied neurophysiology relating to nerve conduction, brain and spinal cord function.

Basic of haemodynamics, autoregulation, homeostasis, cerebral and spinal cord blood flow, blood-brain, blood-CSF, blood-meningeal and blood-choroid barriers.

b) CSF flow dynamics & interplay of haemodynamics& hydrodynamics in CNS, Intracranial pressure
c) equilibrium.

d) Basics of perception of senses including special senses, functions of the hypothalamo-pituitary axis, pyramidal& extrapyramidal systems etc.

e) Monitoring- A brief review of cardiorespiratory and electrophysiological monitoring including SEP monitoring should be an essential part of the syllabus. Principles governing fluid-electrolyte, acid-base balance, systemic and intracranial pressure monitoring, airway management as well as cardiac support should also be an integral part of the curriculum.

f) Coagulation & related physiology of haemostasis, thrombosis etc.

PATHOLOGY AND MICROBIOLOGY

a) General and specific neuropathology of neural neoplasms, infections & infestations, degeneration, demyelination&dysmyelination, trauma & its' sequelae, etc. General orientation of applications of electron microscopy, bacteriology, parasitology and virology in these areas.

b) Neurovascular pathology (with special emphasis on endothelial biology & genetics).

c) Pathology of congenital malformations, neonatal and perinatal CNS disorders.

d) Genetic and metabolic disorders of CNS.

BIOCHEMISTRY AND PHARMACOLOGY

a) Applied neuro-chemistry in relation to neuroradiology.

b) Pharmacology of drug action in relation to neuroradiology.

c) Contrast media.

d) Antihypertensive, antiplatelets and anticoagulants.

e) Vasodilators and vasoconstrictors.

f) Embolic agents.

g) Thrombolytic agents.

h) Anaesthetic and analgesics with respect to neuroimaging and interventions.

PHYSICAL PRINCIPLES & INSTRUMENTATION IN IMAGING

a) Image intensifier and T.V.

b) Tomography.

c) Angiography and digital subtraction angiography with recent advances.

d) CT and recent advancements in CT.

e) Ultrasound, Doppler and colour Doppler ultrasound.

f) MRI, MRA, spectroscopy and functional MRI, EPI etc.

g) Radionuclide studies in CNS, SPECT and PET.

h) PACS and computers in Radiology with special emphasis on image database generation, auditing & conferencing.

i) Planning of department & selection of equipment for the department.
j) Patient monitoring equipments& life support systems in neuroimaging & intervention.

k) Catheters and Biomaterials used in Interventional radiology.

l) Radiation Protection devices with special emphasis on protection during neurointervention.

STEREOTACTIC RADIOTHERAPY AND STEREOTACTIC PROCEDURES

a) Principle, theory and practice of stereotactic Radiotherapy using X-ray source (X-knife) and cobalt course (Gamma-knife).

b) Principle, theory and practice of stereotactic procedures on brain, spine and spinal cord.

EPIDEMIOLOGY AND BIOSTATISTICS IN NEURORADIOLOGY

Part II

Clinical Sciences

1. Neuroradiology: Principle & practice of clinical and applied neuroradiology including Paediatric Neuroradiology, Head and Neck Radiology, Non-invasive Vascular Imaging, Neuro-sonography, Ophthalmic and Otorhinolaryngologic radiology.

2. Interventional Neuroradiology - Principles and practice of Interventional Neuroradiology.

3. Neurology, Neuro-ophthalmology, Neuro-otorhinolaryngology: Principles, theory and practices as related to Neuroimaging & Intervention.

4. Neurosurgery: Basic principles and common problems in neurosurgery.

5. Recent advances and emergency management in neuroradiology.

6. Experimental Neuroradiology.

NEUROSURGERY — M Ch

COURSE CONTENTS

1. Clinical Neurosurgery including history taking, physical examination, diagnosis, selection and planning of relevant investigations, appropriate treatment and rehabilitation of patients with neurosurgical disorders including those presenting as emergencies.

2. Essentials of clinical Neurology especially with reference to disorders common in India and those likely to present to the Neurosurgeons.

3. Basic medical sciences relevant to the practice of Neurosurgery.

4. Surgical Neuropathology and the essentials of the Pathology of Neurological disorders likely to present to the Neurosurgeon.

5. Performance and interpretation of Neuroradiological procedures, such as carotid arteriography and myelography. Familiarity with the technique of selective arteriography and its interpretation.

6. Principles and interpretation of common Neurophysiological, Neuro-ophthalmological, Neuro-otological and Neuroendocrinological tests especially with reference to Neurosurgical disorders.

7. Principles and interpretation of computerized axial tomography, MRI and other modern investigations.

8. Performance of common neurosurgical operations in the supra and infra-tentorial compartments in the spinal canal and on the peripheral nerves – initially under supervision and later independently. Ability to use the operating microscope is mandatory.

9. Familiarity with various types of anaesthesia used in neurosurgery their indications and contraindications, the use of ventilators and techniques of monitoring and resuscitation.

10. Pharmacology of various drugs used in Neurosurgery.

11. Knowledge of the history of neurological surgery and its allied disciplines with special reference to India.

12. Knowledge of recent advances in the field of neurological surgery.

13. Preparation of papers for presentation at scientific conferences and for publication.

14. Introduction to the techniques involved in the organisation and development of a department, its subsections and newer facilities.

15. It is desirable to have microsurgical laboratory training where candidates learn dissection/suturing of fine arteries/nerves under microscope and skull base dissections.

16. Development of proper attitudes towards patients, subordinates, colleagues and seniors.

17. Should have basic knowledge about application of computers.

PAEDIATRIC SURGERY — M Ch

SYLLABUS

I. General knowledge of basic medical sciences as applied to Paediatric Surgery:

1.1 Developmental Anatomy and physiology.

1.2 Applied and regional anatomy.

1.3 Physiology as applied to children.

1.4 Neonatal physiology, metabolism and pathology.

1.5 General pathology-with special emphasis on paediatric conditions.

1.6 Pharmacokinetics in paediatric and neonates.

1.7 Biochemical and metabolic considerations related to paediatric surgery.

1.8 Foetal anatomy physiology and pathology.

II. Growth & Development.

III. Genetics as applied to surgery: parent counselling.

IV. Knowledge of common Paediatric medical conditions and their treatment.

V. Neonatal surgery.

VI. Etiology and treatment of congenital malformations.

VII. Organisation of intensive care unit, referral & transfer services.

VIII. Specialised investigative procedure : technique and interpretation of results.

IX. Pathology of surgical conditions of childhood and broad knowledge of microscopic appearances.

X. Systemic and Regional paediatric surgery. Including Paediatric Urology, Plastic Surgery thoracic and neurosurgery etc.

XI. Paediatric operative surgery.

XII. Trauma in children-including burns.

XIII. Malignancy in childhood – knowledge of antineoplastic drugs and radiation therapy.

There are some items common to the teaching of Pediatrics and can be jointly taken up. Similarly rotation through Paediatric, Newborn ICU and genetics should planned.

A. Basic Sciences

Ethics	
Molecular biology	(relevant to Pediatric Surgery)
Genetics	(relevant to Pediatric Surgery)
Embryology Growth & Development	
Fetal medicine	(diagnosis and management of Surgically correctable lesions)
Physiology as applicable to surgery	(including neonatal physiology, Monitoring, acid-base etc.)
Respiratory physiology	(including ventilatory support)
Metabolism and nutrition	(including principles and practice of parenteral nutrition)
Haematology	(including coagulation defects and transfusion medicine)

B. Training of Surgery

B (I). Neonatal Surgery

Special Anatomy and Physiology as applicable to fetus and newborn

- Surgical technique
- Pre and post operative management
- Ventilatory/respiratory care
- Monitoring
- Investigative Procedures

B (II). General Paediatric Surgery

Wound healing

Infections and sepsis

Organ transplantation

Anesthesia (including pain relief)

Trauma (including burns)

Head and neck (excluding ophthalmic and otorhinolaryngologic disorders)

Abdomen

Umbilicus

Abdominal wall

Hernia

Testis

Adrenals

Vascular Malformations

Hemangioma

Lymphangiomas

Peripheral arterio-venous disorders

Soft Tissue Lesions

Twinnig

Oncology

B (III). Imaging Techniques

Including ultrasound, conventional and specialized Radiology and nuclear scans MRI (Knowledge of radiation biology).

Gastroesophageal reflux

Meconium ileus

Disorders of rotation and fixation

Intestinal obstruction due to various causes

Short bowel syndrome

GI bleeding

Ascites

Necrotisingenterocolities

Inflammatory bowel disease

Peritonitis, other infections

Stomas

Constipation

Obstructive and hemolytic jaundice

B (IV). Genitourinary Tract

Anatomy and physiology

Congenital anomalies

Kidney

Ureter

Bladder

Urethra

Renal

Bladder

Adrenal

Obstructive uropathy

Vesicoureteralrelfux, Megaureter

Urinary tract infections

Urinary lithiasis

Renal vein thrombosis, renovascular hypertension

Urinary diversion and undiversion

Functional disorders of bladder

Hypospadias and epispadias

Other disorders of urethra, penis and scrotoum

Ambiguous genitalia

Female genital tract

Endoscopy, laparoscopy

Urodynamic studies

B (V). Gastrointestinal, Pancreatic, Hepatobiliary

Anatomy and physiology

Congenital anomalies

Esophagus

Stomach

Small bowel

Large bowel

Anorectum

Liver and biliary tree

Pancreas

Spleen

Esophagus

Esophageal burns, strictures, replacement

Esophageal manometry and pH studies

Gastroesophageal reflux

Meconium ileus

Disorders of rotation and fixation

Intestinal obstruction due to various causes

GI Bleeding

Ascites

Necrotisingenterocolitis

Short Bowel syndrome

Inflammatory bowel disease

Peritonitis and other infections

Tumors

Gastrointestinal

Hepatobiliary

Pancreatic

Portal Hypertension

Anorectalmanometry

Endoscopy and Laparoscopy

B (VI). Thoracic

Anatomy and Physiology

Chest wall deformities

Congenital Malformation

Tumors

Chest wall

Mediastinal

Lungs and pleura

Infection of lung and pleura

Foreign bodies

Airway

Congenital Malformations

Breast

Chest wall

Diaphragm

Mediastinum

Aerodigestive tract

Lungs

Disorders of breast

B (VII). Surgical staplers & Endoscopy

B (VIII). Plastic Surgery

Principles,anatomy (relevant)

Burn management and sequele

Cleft lip and Palate,

Choanal Atresia

Syndactyly

Skin graft, flap rotation, z-plasty

B (IX). Neurosurgery

Anatomy and physiology of brain, CSF pathways and spine

Hydrocephalus

Cranio-spinal dysraphism and sequele

Craniofacial deformities

B (X). Oncologic Surgery

Physiologic effects mode of actions, synergism of chemotherapy

- Biopsies
- Curative/palliative resections
- Use of CUSA and Argon laser
- Administration of chemotherapeutic agents, monitoring and management of their complications.

UROLOGY — M Ch

SYLLABUS

It will cover wide spectrum of the diseases of urogenital system &retroperitorium. Apart from the clinical aspect of these subjects, candidate has to acquire indepth knowledge of the related basic subjects like applied; anatomy; embryology, physiology; biochemistry, pharmacology; pathology, microbiology epidemiology, immunology etc.

1. Anatomy and Embryology of GU tracts, adrenal &retroperitoneum.
2. Applied physiology and biochemistry pertaining to Urology, Nephrology, renal transplantation and renovascular hypertension.
3. Investigative urology &Genito-urinary radiology and imaging including nuclear medicine.
4. Male Infertility, Andrology and Urological endocrinology.
5. Sexual dysfunction- investigations and management.
6. Perioperative care, management of urological complications and care of the critically ill patients.
7. Urodynamics and Neurology.
8. Genito-urinary trauma.
9. Urolithiasis-Medical, Biochemical & Surgical aspects.
10. Uro-oncology-Adult &Paediatric
11. Reconstructive Urology.
12. Paediatric Urology-congenital malformations and acquired diseases.
13. Urinary tract infections and sexually transmitted diseases.
14. Obstructive Uropathy.
15. Renal transplantation (including transplant immunology medical & surgical aspects).
16. Renovascular Hypertension.
17. Gynaecological urology.
18. Newer developments in urology.
19. Operative Urology-open & endoscopic
20. Endourology
21. Behavioural and social aspects of urology.
22. Neonatal problems in Urology.
23. Electrocoagulation, lasers, fibre optics, instruments, catheters, endoscopes etc.
24. Retroperitoneal Diseases & Management.
25. Medical aspects of the kidney diseases.
26. Laparoscopic Urologic Surgery.

Apart from above mentioned subjects, each candidate should have basic knowledge of the following:

1. Biostatistics & Epidemiology.
2. Computer Sciences.
3. Experimental & Research methodlogy and Evidence Based Medicine.
4. Scientific presentation.
5. Cardio-pulmonary resuscitation.
6. Ethics in medicine.