Guidelines

for

Competency Based Training Programme

in

DNB- GENERAL MEDICINE

NATIONAL BOARD OF EXAMINATIONS

Medical Enclave, Ansari Nagar, New Delhi-110029, INDIA
Email: mail@natboard.edu.in Phone: 011 45593000

CONTENTS

PROGRAMME GOAL

Goal at the end of three year training is to enable the individual to function as a junior consultant in the field of general medicine with a analytic and ethical mind with purpose of what should be done and what can not be done. He should be able to provide preventive, promotive, curative and rehabilitative medical care.

PROGRAMME OBJECTIVES

- Able to diagnose the handle clinical problem of general internal medicine, using traditional methods of recording and thorough history and performing a detailed physical examination

- Able to make to logical diagnosis/differential diagnosis for an individual patient using the theoretical knowledge and clinical experience acquired during the period of his post-graduate training.

- Familiar with the epidemiological & clinical pattern of the common diseases prevalent in different Geographical Areas in India.

- Approach able to evidence based with sufficient knowledge and ability to reasonably analyze the results of common investigative procedures/methods/confirming the diagnosis of disease in a particular patient and is able to use the available investigations in a appropriate way so as to course minimal physical discomfort to the patient and is cost effective for the individual patient/health service provider.

- Well versed with the Theoretical background including the recent advances of the various diseases affecting different system of the body.

- Familiar with and carry out the Basic and Advanced Life Support Methods so as to save the life of a patient in an emergency situation.

- Clinical- Clinical assessment, presentation of cases & management of patient; investigations-interpreting, performing procedures (diagnostics/therapeutic). No limit can be set for clinical knowledge in the field of medicine. But the individual should have basic information about various diseases covered by the standard text books in the field of internal medicine with special stress on the pattern of disease prevalence in various geographical areas with in the country and the globe. The candidate should be aware of recent information appearing in standard medicine journals. He should have basic knowledge of various psychiatric and dermatological problems.

- This is the process by which the trainee learns to make diagnostic and therapeutic decisions. It includes

    - Integration of medical knowledge and clinical skills.
    - Consideration of diagnostic and therapeutic alternatives.
    - Consideration of the risk – benefit ratio for the patient and awareness of cost of investigations and treatment.

ELIGIBILITY CRITERIA FOR ADMISSIONS TO THE PROGRAMME

DNB General Medicine Course:

1. Any medical graduate with ***MBBS*** qualification , who has qualified the ***Entrance Examination*** conducted by NBE and fulfill the eligibility criteria for admission to DNB ***Broad Specialty*** courses at various NBE accredited Medical Colleges/ institutions/Hospitals in India is eligible to participate in the Centralized counseling for allocation of DNB General Medicine seats purely on merit cum choice basis.

2. Admission to 3 years post MBBS DNB General Medicine course is only through ***Entrance Examination*** conducted by NBE and Centralized Merit Based Counseling conducted by National Board of Examination as per prescribed guidelines.

Duration of Course: 3 Years

Every candidate admitted to the training programme shall pursue a regular course of study (on whole time basis) in the concerned recognized institution under the guidance of recognized post graduate teacher for assigned period of the course.

TEACHING AND TRAINING ACTIVITIES

The fundamental components of the teaching programme should include:

1. Case presentations & discussion- once a week
2. Seminar – Once a week

3. Journal club- Once a week
4. Grand round presentation (by rotation departments and subspecialties)- once a week
5. Faculty lecture teaching- once a month
6. Clinical Audit-Once a Month
7. A poster and have one oral presentation at least once during their training period in a recognized conference.

The rounds should include bedside sessions, file rounds & documentation of case history and examination, progress notes, round discussions, investigations and management plan) interesting and difficult case unit discussions.

The training program would focus on knowledge, skills and attitudes (behavior), all essential components of education. It is being divided into theoretical, clinical and practical in all aspects of the delivery of the rehabilitative care, including methodology of research and teaching.

Theoretical: The theoretical knowledge would be imparted to the candidates through discussions, journal clubs, symposia and seminars. The students are exposed to recent advances through discussions in journal clubs. These are considered necessary in view of an inadequate exposure to the subject in the undergraduate curriculum.

Symposia: Trainees would be required to present a minimum of 20 topics based on the curriculum in a period of three years to the combined class of teachers and students. A free discussion would be encouraged in these symposia. The topics of the symposia would be given to the trainees with the dates for presentation.

Clinical: The trainee would be attached to a faculty member to be able to pick up methods of history taking, examination, prescription writing and management in rehabilitation practice.

Bedside: The trainee would work up cases, learn management of cases by discussion with faculty of the department.

Journal Clubs: This would be a weekly academic exercise. A list of suggested Journals is given towards the end of this document. The candidate would summarize and discuss the scientific article critically. A faculty member will suggest the article and moderate the discussion, with participation by other faculty members and resident doctors. The contributions made by the article in furtherance of the scientific knowledge and limitations, if any, will be highlighted.

Research: The student would carry out the research project and write a thesis/ dissertation in accordance with NBE guidelines. He/ she would also be given exposure to partake in the research projects going on in the departments to learn their planning, methodology and execution so as to learn various aspects of research.

SYLLABUS

Basic Sciences

- Basics of human anatomy as relevant to clinical practice e.g. surface anatomy of various viscera, neuroanatomy, important structures/organs location in different anatomical locations in the body; common congenital anomalies.

- Basic functioning of various organ-system, control of vital functions, pathophysiological alteration in diseased states, interpretation of symptoms and signs in relation to pathophysiology

- Common pathological changes in various organs associated with diseases and their correlation with clinical signs ; understanding various pathogenic processes and possible therapeutic interventions possible at various levels to reverse or arrest the progress of diseases

- Knowledge about various microorganisms, their special characteristics important for their pathogenetic potential or of diagnostic help; important organisms associated with tropical diseases, their growth pattern/life-cycles, levels of therapeutic interventions possible in preventing and/or eradicating the organisms

- Knowledge about pharmacokinetics and pharmaco-dynamics of the drugs used for the management of common problems in a normal person and in patients with diseases kidneys/liver etc. which may need alteration in metabolism/excretion of the drugs; rational use of available drugs & "P" drug concept

- Knowledge about various poisons with specific reference to different geographical and clinical settings, diagnosis and management

- Knowledge about mass casualties, food poisoning, H1NI, Emergency medicine etc.

CARDIOLOGY

Theoretical knowledge

• Normal cardiac anatomy and physiology.
• Congenital heart disease especially in adult life and pregnancy.
• Valvular heart disease including aetiology, pathophysiology, diagnosis and management, valve surgery and prosthetic valves.

• Aetiology, diagnosis and management of pulmonary embolism, hypertension, corpulmonale, cardiomyopathy, myocarditis, endocarditis, pericardial diseases, aortic aneurysm and dissection, cardiac transplantation, cardiac changes and problems in pregnancy, heart failure.
• Cardiac arrythmias including ECG, clinical diagnosis and management of patients with brady and tachyarrythmias and syncope with use of pacing and understanding of the pharmacology and clinical applications of antiarrythmic and cardioactive drugs.
• Coronary disease including pathophysiology; risk factors and management; use of tests for diagnosis, prognostic assessment and management; management of stable and unstable angina and myocardial infarction including diagnosis, therapy, revascularization, complications, secondary prevention, rehabilitation, risk stratification etc ; understanding of indications for and principles of coronary surgery and post surgical management.
• Cardiac investigations including detailed knowledge and practical experience in standard EKGs, 24 hour EKG monitoring and stress testing; knowledge of echocardiography, indications for and interpretation of cardiac nuclear medicine scans, cardiac CT & MRI, cardiac catheterization and angiography including understanding of the procedures with complications and pre and post procedure management.

Practical skills

• Mechanics and interpretation of EKG.
• Interpretation of X-Ray Chest.
• TMT monitoring and interpretation
• Ambulatory EKG monitoring and interpretation.
• Cardiopulmonary resuscitation including BLS and ACLS.
• Hollter monitoring
• Thallium Scan
• Dobitamin Stress test
• Angiography and angioplasty
• Treating dysrhythmias and conduction disturbances. External pacing and TPI
• Central line insertion and CVP measurement.
• Insertion of arterial line
• Thrombolysis.

NEUROLOGY

Theoretical knowledge

• Normal anatomy, physiology and anatomic principles that allow localization of neurologic disease.
• Ability to diagnose and manage common neurological disorders including strokes, TIAs, SAH, SDH, epilepsy, nonepileptic seizures and other psychogenic illnesses, migraine, dementia, multiple sclerosis, Parkinson's disease, myelopathy, myopathies,

neuropathies, MND, disorders of neuromuscular junction, meningitis, encephalitis, neoplasms, brain abscess, vasculitis, pyramidal and extrapyramidal disorders, disorders of sensation, hearing, vision, cerebellar disorders, autonomic nervous system disorders & sleep disorders etc.

• Knowledge of and ability to diagnose congenital disorders like Brain and Spinal cord malformations, Arnold Chiari Malformation, Meningomyelocele, Cortical malformations etc., Chromosomal abnormalities, micro and Macrocephaly, Aberrant development like Development delay, Mental retardation, Neurodegenerative diseases, developmental disorders of higher cerebral function like Mental retardation, Developmental language disorders, learning disabilities (e.g. , dyslexia), attention deficit disorders, pervasive developmental disorders (e.g., autism) etc.

• Recognition and early treatment with appropriate onward referral of neurological emergencies such as coma, raised intracranial pressure, status epilepticus, infection, visual failure, spinal cord compression, neuromuscular respiratory failure including GB syndrome, neoplastic disease, Wernick-Korsakoff encephalopathy and giant cell arteritis.

• Knowledge of nutritional and metabolic diseases of nervous system and manifestations of disease.

• Understanding of the assessment of the brain death and an appreciation of ethical issues associated with managing brain death, terminal motor neuron disease and the entry of patients with coma, aphasia or confusion into research studies.

• Knowledge of indications, capabilities and limitations of investigations such as lumbar puncture & CSF examination, CT and MRI of brain and spinal cord, duplex ultrasonography, spinal CT angiography, MR angiography, EEG, electromyography and nerve conduction studies, evoked potential studies, myelography and invasive digital subtraction cerebral angiography

• Some knowledge of the indications for neurosurgery.

Practical skills

• Lumbar puncture

• Muscle biopsy, EEG, EMG and Nerve Conduction Velocity test

• Taking a history and performing a complex neurologic and mental status examination, Glasgow coma scale. Using clinical knowledge to localize a lesion and to assess the acuity and prognosis of clinical problem and formulate a rational plan of further investigation and management.

INTENSIVE CARE MEDICINE

Theoretical knowledge

• Assessment and Medical management of trauma patients; respiratory failure and acute respiratory disorders like ARDS, COAD, pulmonary embolism, empyema, pneumothorax etc; acute cardiovascular disorders like CHF, IHD, dysrhythmias,

cardiac arrest, aortic aneurysms; toxicologic emergencies, sepsis, shock, renal failure, acid base disorders; neurologic emergencies like coma, CVAs, seizure disorders, spinal cord compression, infectious and inflammatory disorders; environmental disorders like heat and cold injuries, burns, electrocution, hypersensitivity reactions etc.

• The assessment and resuscitation and ongoing acute management of critically ill and injured patients with life threatening single and multiple organ system failure.

• Indications and interpretations of diagnostic tests like EKGs, radiology imaging of acute head and cervical spine injuries, chest pathology, acute abdominal conditions, pelvis and extremity injuries.

• Recognition and understanding of the correct use of drugs and therapies within the ICU pharmacopoeia: analgesics, sedatives, muscle relaxants, inotropic agents, antidysrhythmia drugs, including digoxin, diuretics, antibiotic drugs and fluids for resuscitation.

• Physiological monitoring and clinical measurement.

• Knowledge of principles of care, medicolegal issues like informed consent, laws and liability.

Practical skills

Airway management

♦ Heimlich maneuver
♦ Optimising airway patency / bag mask ventilation
♦ Oral, nasotracheal esophageal- obturator, and intubations in children and adults.
♦ Needle thoracentesis and tube thoracostomy
♦ Mechanical ventilation including a range of ventilatory modes and strategies.

Hemodynamic techniques

♦ Arterial catheter insertion / blood gas sampling
♦ Central venous access (jugular, femoral, subclavian, brachial.)
♦ venous cut down
♦ renal replacement therapy

Diagnostic and therapeutic procedures

♦ Control of epistaxis.
♦ Peritoneal tap and lavage
♦ Lumbar puncture
♦ Pericardiocentesis
♦ Nasogastric intubation and Thoracentesis

• Understanding the principles and monitoring of plasmapheresis and desensitization.

RESPIRATORY MEDICINE

Theoretical knowledge

• Understanding of basic respiratory and sleep physiology.
• Assessment of respiratory symptoms and signs.
• Interpretation of CXRs, arterial blood gases, basic lung function and understanding of indications for bronchoscopy, thoracoscopy and needle biopsy.
• Handling of respiratory emergencies like severe pneumonia, pneumothorax, acute severe asthma, acute respiratory failure, pulmonary thromboembolism, acute upper respiratory obstruction
• Knowledge of aetiology, pathophysiology, differential diagnosis and management of obstructive lung diseases like asthma & COPD and restrictive lung diseases like ILD.
• Management of sleep disorders like obstructive and central sleep apnoea, neuromuscular diseases and ventilatory failure.
• Assessment and management of respiratory infections like parenchymal infections including bronchitis, bronchiectasis and pneumonia (including complications and empyema and parapneumonic effusions); cystic fibrosis; oppurtunistic infections in the immunocompromised, spectrum of infections and noninfectious manifestations in HIV related pulmonary disease; tuberculosis, nontuberculosis mycobacterial infections and fungal diseases.
• Investigation and management of pulmonary vascular disease like pulmonary thromboembolism, pulmonary hypertension • Staging assessment and management of primary and secondary lung cancers, mesotheliomas and mediastinal tumors.
• Pathophysiology and management of ARDS.
• Knowledge of selection of potential recipients for lung transplantation and management of post transplant problems and survival.
• Knowledge of occupational lung diseases and pulmonary involvement in systemic diseases like sarcoidosis.

Practical skills

• Aspiration of pleural effusion and biopsy.
• Insertion of intercostals drain / catheter and subsequent management of drain.
• Establishment and maintenance of oropharyngeal airway.
• Endotracheal intubation
• Spirometry
• Bronchoscopy

NEPHROLOGY

Theoretical knowledge

Fluid , electrolyte and acid base homeostasis :

♦ Recognition of under and over hydration; causes, consequences and treatment.
♦ Electrolyte disorders associated with altered sodium, potassium, acidbase and water homeostasis. Appropriate treatment of these disorders.
♦ Biochemical tests of renal function; urinalysis and urine microscopy; serological testing; appropriate use of renal imaging techniques.
♦ The differential diagnosis and management of proteinuria, hematuria, oliguria, polyuria.
♦ Indications and requirements for and complications of renal biopsy.
♦ Immunopathogenesis and treatment options of major glomerulopathies.
♦ Aetiology, complications and management of nephrotic and nephritic syndromes.
♦ Aetiology, clinical manifestations and treatment of diabetic and analgesic nephropathy, reflux nephropathy, tubulointerstitial diseases of kidneys.
♦ Upper and lower urinary tract infections, nephrolithiasis and obstructive uropathy: diagnosis and management including indications for emergency nephrostomy.
♦ Inherited renal diseases like PKD, alport's disease.
♦ Renal stone disease : Incidence, aetiology, clinical manifestations, prevention, drug therapy, urologic principles.
♦ Incidence, natural history, diagnosis and management of hypertensive renal disease and renovascular disease.

Acute and chronic renal failure Defination, differentiation between prerenal, renal and post renal causes of renal failure, knowledge of common causes, clinical manifestations, assessment of severity, nondialytic therapy including principles of calcium-phosphate balance; effect of common drugs on renal function and principles of dose modification of drugs in renal failure.

• Indications, various modes and complications of Hemo Dialysis and Peritoneal Dialysis

Renal transplantation Screening of potential recipients and donors, immunosuppressive regimens, recognition and management of post transplant problems, basic principles of diagnosis and management of cellular and vascular rejection.

Practical skills

• Urine microscopy
• Renal biopsy.
• Hemodialysis, peritoneal dialysis, CRRT and management of all complications.
• Tenckhoff catheter insertion and its further management
• Insertion of double lumen AV catheter for hemodialysis

ENDOCRINOLOGY AND METABOLISM

Theoretical knowledge

- Basic mechanisms of hormone action in health and disease :
- Structure and synthesis of peptide and steroid hormones.
- Transport and delivery of hormones to target organs.
- Negative feedback control of hormone secretion.
- Interaction of hormones with receptors and second messengers.
- Assessment of endocrine function
- Interpreting the results of common endocrine laboratory tests
- Assessment and management of functioning and nonfunctioning anterior pituitary tumors, hyperprolactinemia, acromegaly and posterior pituitary disorders.
- Hypopituitarism
- Diabetes insipidus and SIADH
- Aetiology, diagnosis and management of hyper and hypothyroidism with complications including thyroid storm and myxoedema coma; diagnosis and principles of management of Iodine deficiency disorders, autoimmune thyroid disorders, thyroid nodule, goitre and thyroid carcinoma.
- Diagnosis and management of syndromes of adrenocortical excess and insufficiency.
- Assessment and principles of management of hypogonadism, disorders of fertility, male impotence, use of gonadal harmone replacement, hirsutism, and androgen excess syndromes, PC OD etc.
- Diagnosis, investigations and management of hypo and hypernatremia, hypo and hyperkalemia, hypo and hypercalcemia including hyperparathyroidism and hyperparathyroidism of malignancy and hyper and hypovitaminosis D.
- Aetiology, diagnosis and management of osteoporosis and fractures including post menopausal osteoporosis and harmone replacement therapy .
- Obesity & Metabolic syndrome
- Polycystic ovarian disease & hirsutism.
- Paget's disease of bone.
- Diagnosis and management of ectopic humoral syndromes.
- Aetiology, classification, risk stratification, prevention and management of dyslipidaemia including ATP guidelines.
- Aetiology, classification, diagnosis, investigations and management of diabetes(Life style & pharmacotherapy) and its micro and macrovascular complications including
- Initial management of newly presented diabetes.
- The pathophysiological basis of Type I, Type II Diabetes and GDM
- Pathophysiology and management of hyperglycemic crisis (Diabetic Ketoacidosis & Hyperosmolar coma) and hypoglycemia.
- Management of diabetes during surgery and acute illnesses.
- Management of erectile dysfunction
- Management of neuropathies including autonomic neuropathy.
- Management of nephropathy, retinopathy, hypertension, dyslipidaemia, CAD in diabetic patients

- Principles of management of diabetes in pregnancy including gestational diabetes.
- Management of diabetic foot including prevention and treatment of diabetic foot ulceration, cellulitis and gangrene.
- Multidisciplinary approach to modern diabetes care and the importance of patient participation and patient education.

Practical skills:

- Taking detailed history & clinical evaluation of endocrine disorder
- Managing insulin and oral hypoglycemic therapy.
- Fingers prick blood glucose monitoring.
- Ophthalmoscopy
- Interpretation of BMD tests and Hormonal assay
- Assessing autonomic neuropathy

ALLERGY AND IMMUNOLOGY

Theoretical knowledge

• Structure and function of cellular and humoral components of immune system.
• Immune response and hypersensitivity reactions.
• The types of tissue injury mediated by cells with immune function, antibodies, immunological and inflammatory mediators such as cytokines and complement components etc.
• The mechanisms involved in the generation and control of immune responses to foreign proteins, allergens, microorganisms and autoantigens.
• Knowledge of immunogenetics especially the HLA system and its role in transplantation and disease association.
• Diagnosis and management of primary and secondary immunodeficiency disorders
• The diagnosis and management of allergic disorders including asthma, rhinitis, urticaria / angioedema,anaphylaxis, food allergy and other reactions.
• Knowledge of the mechanisms of action, pharmokinetics and indications for the use of antihistamines, bronchodilators, inhaled steroids and other anti-allergy pharmaceuticals.
• Organ specific and multisystem autoimmune diseases including rhematological disorders.
• Systemic vasculitides.
• Amyloidosis, sarcoidosis and immune complex disorders.
• Monoclonal antibodies: diagnostic & therapeutic role

Practical skills

• Skin testing: Intradermal testing

• Exercise challenge testing.
• Management of laryngeal oedema & anaphylactic shock
• Recognition & Management of hypersensitivity reactions

GASTROENTROLOGY AND HEPATOLOGY

Theoretical knowledge

• Assessment, investigation and management of heartburn, chest pain, dysphagia, persistent vomiting and dyspepsia.
• Diagnosis and management of oesophageal dysmotility, infections and reflux.
• Acute and chronic abdomen pain.
• Diagnosis and management of peptic ulcer including detection and treatment of H. pylori.
• Investigation, diagnosis and management of acute and chronic upper as well as lower GI bleed.
• Malabsorption syndromes including diagnosis and management of coeliac disease and tropical sprue.
• Presentation, investigation, diagnosis and management of GI malignancy including oesophageal, gastric, pancreatic and colorectal cancer.
• Diagnosis and management of inflammatory bowel diseases including their complications
• Irritable bowel syndrome and functional bowel disease.
• Aetiology, presentation, complications and management of acute and chronic pancreatitis.
• Diarrhoea, GI infection and AIDS.
• Causes, investigations and management of acute and chronic liver disease, Cirrhosis, Hepatic encephalopathy and immunologic liver disease.
• Liver Abscesses diagnosis, management and complications
• Diagnosis, prophylaxis and management of hepatitis including viral hepatitis.
• Haemochromatosis.
• Diagnosis and management of HCC and other hepatic tumors.
• Knowledge of appropriate use of endoscopy, colonoscopy, hepatobiliary imaging and radiological imaging (Ultra sound, CT, Barium studies) other diagnostic tests in gastrointestinal disease.
• Tests of malabsorption

Practical skills

• Abdominal Paracentesis.
• Upper and lower GI Endoscopy, Capsule Endoscopy
• Insertion of nasogastric tube and Sengstaken Blakemore tube.
• Liver biopsy
• Abdominal fat pad biopsy for amyloidosis.
• Endo Ultrasound and Fibroscan including FNA

HEMATOLOGY AND ONCOLOGY

Theoretical skills

• An understanding of haemopoesis and how the cellular elements of the blood are made.
• Mechanisms, investigations and therapy of red cell disorders like anaemias, polycythemias, thalassemias, haemoglobinopathies.
• Pathophysiology, investigation and therapy of white cell disorders like leukemias, lymphomas, myeloproliferative disorders, myeloma and other plasma cell disorders.
• Bone marrow failure disorders
• Pathophysiology, investigation and therapy of platelet disorders like thrombocytosis and thrombocytopenia.
• Diagnosis and management of acquired disorders of haemostasis like DIC as well as inherited disorders like haemophilia and VW disease and an understanding of prevalence, investigation and management of thrombophilia.
• Coagulation disorders
• Indications for transfusion of red cells, platelets, fresh frozen plasma, cryoprecipitate, albumin and immunoglobulin concentrates. The principles of cross matching and assessment of transfusion reactions.
• Principles of autologous and allogenic haemopoetic stem cell transplantation including tissue typing, high dose therapy and graftversus-host disease.
• Assessment and management of haematological emergencies like neutropenic fever, massive haemorrhage, abnormal bleeding, thromboembolism, hypercalcemia, vomiting and pain relief.
• Principles of laboratory haematology like blood counting and morphology, immunophenotyping, cytogenetic analysis, simple tests of haemostasis and blood cross matching.
• Assessment of acutely ill patients with malignancy & Management of oncological emergencies due to disease or therapy including hypercalcaemia, SVC obstruction, spinal cord compression, cardiac temponade, neutropenic infection.
• Principles of cancer staging.
• Principles of anticancer therapy including endocrine, cytotoxic, radiation and palliative; principles of monitoring of patients receiving anticancer therapy.
• Knowledge of cancers that can be cured by primary chemotherapy including testicular cancers and lymphomas; knowledge of cancers in which adjuvant or neoadjuvant chemotheapy may enhance the outcomes of local treatment including breast, head and neck, lung, colon and ovarian cancers; knowledge of common cancers that can be palliated by nonsurgical cancer therapies including breast cancer, lung cancer, colorectal cancer and prostate cancer.
• Knowledge of paraneoplastic syndromes associated with cancer.
• Mechanisms of action and toxicities of various classes of cytotoxic drugs,
• Principles of palliative therapy.

• Understanding of genetic pathophysiology of common malignancies including breast, colon, and stomach cancer and leukemias.
• Porphyrias and other RBC Disorders
• Hematolymphoid malignancies including Non-Hodgkin's Lymphoma, Hodgkin's disease and Leukemia etc.

Practical skills

• Blood transfusion and administration of blood and blood products.
• Insertion and care of central lines.
• Prescription and safe administration of intravenous chemotherapy.
• Performance of thoracentesis, ascitic tap and lumbar puncture, Bone marrow aspiration & Biopsy
• Flow Cytometry and other molecular techniques
• Discussion with patients and their relatives about the diagnosis and prognosis of malignancies.

IMMUNE MEDIATED INFLAMMATORY AND RHEUMATOLOGICAL DISORDERS

Theoretical knowledge

Classification, clinical features, diagnosis, lab findings, pathophysiology and management of inflammatory as well as non inflammatory disorders including :

- Rheumatoid arthritis.
- Infectious arthritis.
- Osteoarthritis.
- Ankylosing spondylitis, reactive arthritis, psoriatic arthritis, arthritis associated with inflammatory bowel disease.
- SLE, Sjogren's syndrome, Behcet's syndrome, polymyosists, dermatomyositis, inclusion body myositis, systemic sclerosis, MCTD.
- Vasculitis including PAN, Takayasu's, temporal arteritis and polymyalgia rheumatica.
- Sarcoidosis
- Gout, pseudogout and chondrocalcinosis.
- Osteoporosis, osteomalacia and paget's disease.
- Use of anti-inflammatory, disease modifying and immunosuppressive drugs including their adverse affects and safety monitoring procedures.
- Management of chronic progressive disorders including the appropriate use of medical therapy, role of orthopedic surgery, workings of multidisciplinary team like physiotherapy, occupational therapy and means of evaluating and addressing disability and handicap including the provision of aids.

- Management of acute rheumatological emergencies like red hot joint, temporal arteritis, acute low back pain, vasculitis and development of cervical myelopathy in rheumatoid arthritis.

Practical skills

• Examination of joints & ability to distinguish between inflammatory & non inflammatory joint diseases.
•Interpretation of Various Immunological Markers of Inflammation
• Evaluation & interpretation of radiological images of joints.
• Knee joint aspiration.
• Physical Rehabilitation
• Assess various disease activity scores
• Educate the patient and family about disease, its progression and prognosis and community resources etc.

GERIATRIC MEDICINE

Theoretical knowledge

- The underlying physiologic normal aging changes in various body systems including diminished homeostatic abilities, altered metabolism and reduced functional reserve.
- Alteration of normal physical examination with ageing.
- The unique modes of presentation of elderly patients for care, including altered and nonspecific presentations of diseases.
- Interpretation of laboratory values in elderly.
- The hazards of drug treatment in elderly people including pharmokinetic and pharmacodynamic changes in drug handling with age and disease, risks of multiple drug prescription, iatrogenic drug induced disease.
- Management of specific syndromes encountered in old age like falls, cognitive impairment, delirium, pain, urinary and fecal incontinence, constipation, gait disorders.
- Management of specific diseases with strong age associated risk such as strokes, hypertension, hypotension, dementia, arthritis, osteoporosis, pressure ulcers, Parkinson's disease.
- The presentation and management of psychiatric illness in old age and its relationship to physical illness.
- Understanding of important ethical and legal issues in caring for elderly people.
- The range of services available to promote rehabilitation or maintenance of an independent lifestyle for elderly people, increasing their ability to function as long as possible in their existing family, home and social environment.
- The risks and adverse outcomes in geriatric care of polypharmacy, iatrogenic illness, immobilization and its consequences, over dependency, inappropriate

institutionalization, non recognition of treatable illness, over treatment, inappropriate use of high technology and the unsupported family.

- Understanding the role of aids and appliances in rehabilitation of elderly disabled people.
- The use of rating scales in particular clinical situation, e.g., a mental test score, a geriatric depression scale, and scoring of activities of daily living using a recognized scale.

Practical skills:

• Administration of functional and cognitive assessment scales.
• Obtaining a comprehensive history and mental status examination.
• Communicating to the patient and the care givers the proposed investigation and treatment in such a way as to promote understanding, compliance and appropriate attitudes
• Counseling about psychologic, social and physical stresses and changes of age, dying and death.

ADOLESCENT HEALTH

Theoretical knowledge

• Normal anatomy and physiology associated with puberty and adolescent years.
• Stages of adolescence and psychologic growth and development in each stage.
• Adolescent health care including history taking, physical examination, screening tests and interpretation, immunizations, healthy diet, cessation of smoking and recreational drug use, safe sexual practices etc.
• Variations in physical growth and development like short and tall stature, precocious and delayed puberty, delayed menarche etc.
• Specific problems of adolescents like acne, obesity, sexual concerns, pregnancy, psychiatric issues, learning and eating disorders, infections, violence, substance abuse
• Medicolegal issues of adolescents.

Practical skills

• Growth & pubertal assessment
• Taking a history and sexual history and performing a physical examination
• Providing patient education for preventive measures appropriate for adolescent health care needs
• Determining their parental relationship and dealing with adolescents in the context of their family and community.

Psychiatry Disorder

- Biology of Psychiatry disorders
- Mental disorders
- Alcohol and Alcoholism
- Substance abuse

DERMATOLOGY

Theoretical knowledge

a) Diseases predominantly cutaneous with possible systemic associations :

- Inflammatory skin disease
- Eczema- atopic, discoid, stasis, seborrhoeic dermatitis, psoriasis, acne rosacea, urticaria, photosenstivity.
- Infection, infestation.
- Viral – warts, herpes zoster / simplex, mollscum contagiosum, HIV, exanthems.
- Bacterial – acute like streptococcus, staphylococcus, impetigo, cellulitis; chronic like TB, leprosy and syphillis.
- Fungal – Dermatophyte, candidiasis, pityriasis versicolor.
- Infestation – scabies, pediculoses.
- Immunologically mediated – pemphighus, pemphigoid, dermatitis herpetiformis, alopecia areata, vitiligo, acute and chronic cutaneous vasculitis, cutaneous lupus erythematosus.
- Drug reactions – urticaria, maculopapular eruptions, erythema multiforme, steven johnson's syndrome
- Generalized pruritis.
- Skin tumours : Benign – seborrhoeic keratoses, melanocytic naevi, dermatofibroma, hemangioma and other vascular abnormalities. Malignant / pre-malignant – solar keratoses, Bowen's disease, BCC, SCC, melanoma, Kaposi's sarcoma.

b) Diseases predominantly systemic with possible cutaneous associations:

- Systemic malignancy- acanthosis nigricans, dermatomyositis, erythema nodosum, epidermolysis bullossa acquisita, pruritis.
- Metabolic diseases – diabetes, hyper or hypothyroidism, porphria, liver / renal failure, androgenisation.
- Immunologically mediated / collagen vascular disease – lupus erythematosus, dermatomyositis, RA, PAN, vasculitis.
- IBD – polyderma gangrenosum, oral mucosal disease, erythematous nodosum.

- Dermatological emergencies – disseminated herpes simplex, acute angiooedema, anaphylaxis, acute allergic contact dermatitis, erythroderma, TEN, pustular psoriasis.

Practical skills

• Skin biopsy.
• Excision of skin lesions.
• Intralesional injection of corticosteroids.
• Incision and drainage.
• Nutrition counseling and routine skin care.

CLINICAL GENETICS

Theoretical knowledge

• Ability to collect and record pedigree information
• Understanding of genetic segregation analysis, including methods and interpretation of linkage analysis. Application to autosomal dominant and recessive, sex linked, multifactorial and mitochondrial inheritance.
• Statistical approaches to risk interpretation and explanation of inheritance patterns and calculated or empiric risk figures to families.
• Basic molecular and biochemical genetics, including understanding of the mechanism and applications of Southern and Northern blotting, polymerase chain reaction, reverse transcription, allele specific hybridisation, DNA sequencing, DNA polymorphism analysis. Major pathways involved in energy and nitrogen metabolism.
• Basic understanding of the definations and underlying processes for heterozygosity, homozygosity, polymorphism vs mutation, genetic heterogeneity, allelic heterogeneity, phenocopies, variable expressivity, age specific penetrance, new muatation, germline versus somatic mosaicism, variable penetrance, genomic imprinting, triplet repeat diseases, anticipation, epigenetic factors, somatic mutation, multifactorial inheritance, genetic control of continuous variables like height, blood pressure, intelligence.
• Teratology and developmental genetics including ability to identify individual with a personal or family history of physical or psychomotor developmental abnormalities for which genetic assessment would be appropriate.
• Cytogenetics : trisomy, monosomy, aneuploidy, deletion, inversion, duplication, reciprocal and Robertsonian translocation, florescent insitu hybridisation
• Cancer genetics including genetic mechanisms involved in acquired or inherited cancer and when to refer for a family history of cancer.
• Common adult onset conditions for which pre-symptomatic or predictive testing is available.
• Community genetics including principles and practices of screening.

• Pharmacogenetics : Psuedocholinesterase deficiency, acetylator activity, malignant hyperthermia, porphyrias, G-6PD deficiency, special anaesthetic problems encountered in myotonic and muscular dystrophies.
• Informed consent for genetic testing. Importance of privacy, autonomy, avoidance of harm, nondirectiveness, confidentiality of results and records.

Practical skills

• The use of genetic databases such as Online Mendelian Inheritance in Man to obtain current information about diagnosis and DNA analysis for known genetic conditions
• Genetic counseling.
• Chromosomal Disorders
• Practice of genetics in clinical Medicine
• Mitochondrial DNA and Heritable Traits and diseases
• The Human Microbiome

INFECTIOUS DISEASES

Theoretical knowledge

• Diseases caused by Gram +ve and Gram –ve bacteria
• Spirochetal Diseases
• Diseases caused by Ricketesiae, Mycoplasma and Chlamydiae
• Principles and management of infection: clinical assessment of the febrile patient; the use of simple microbiological investigations; initiation of appropriate empirical and directed antimicrobial therapy.
• Evaluation and management of PUO.
• Principles of immunization and antibiotic prophylaxis.
• The mechanism of disease and host responses in infection.
• Infection in special hosts: infections in intensive care, infections associated with immunocompromised states like diabetes, alcohol abuse, chronic liver disease, old age, steroid treatment, neutropenic individuals and transplant recipients.
• Recognition and management of acute infectious emergencies including septicemia, meningitis, falciparum malaria, enteric fever, kala azar etc.
• Knowledge of clinical illness produced by bacterial, protozoal, helminthic, viral and fungal pathogens.
• Principles of hospital acquired infections.
• Principles of infection control in the community including epidemology, transmission and prevention of common infections which threaten a community.
• Evaluation of acutely ill, febrile travelers and patients from overseas.
• Recognition and management of common community acquired infection such as lower respiratory tract infection, urinary tract infection, skin and soft tissue infection, infective arthritis, enteritis, hepatitis, biliary tract infection, endocarditis.

• Recognition & management of Mycobacterial diseases
• Management of common STDs with knowledge of aetiology and investigations for management of urethral and vaginal discharge, cystitis, proctitis, prostatitis, epididymitis, and reactive arthritis.
• Aetiology, staging, clinical manifestations, complications and management of HIV patients.
• Diagnosis, evaluation and management of HIV positive and AIDS: recognition, counseling and testing; antiretroviral therapy; management of major complications and prophylaxis.
• HIV associated Tuberculosis
• Viral Diseases- Infection due to DNA Virus – Infection due to RNA Respiratory Virus
• Fungal Infections
• Protozoal and Helminthic Infections

Practical skills

• Blood cultures from peripheral and central sites.
• Tuberculin test.
• Wound culture.
• Communication skills: taking an infectious disease (including sexual) history; counseling for HIV testing.
•Evaluation and algorithm of Neutropinic Fever
• Pediatric Immunization
• Adult Immunization
• Aspiration of liver abscess and guided aspiration of pus from other sites.
• Post exposure prophylaxis.

POISONING, DRUG OVERDOSE AND ENVENOMATION

- Evaluation and Management of Common Poisoning
- Bioterrorism
- Snake Bite, Marine animal, Arthropods and Mammalian Bites

DISORDERS ASSOCIATED WITH ENVIRONMENTAL EXPOSURE

- Altitude illness
- Hypo thermia and frost bite
- Heat related illness
- Climate change and global warming

CLINICAL PHARMACOLOGY

Theoretical knowledge

• **Principles underlying rational drug use**

- Pharmacodynamics including receptor / drug interactions, dose response, efficacy, tolerance, potency, agonists and antagonists.
- Pharmacokinetics including definition of drug clearance, half life, volume of distribution, therapeutic ratio, absolute and comparative bioavailability, drug transport and metabolism, the cytochrome family of enzymes. The importance of these concepts to choice of routes, dose, dose frequency of medications.
- Mechanisms of drug interactions and therapeutic drug monitoring.
- Systematic clinical pharmacology:
- Cardiovascular : diuretics, beta- blocking agents, ACE inhibitors, calcium channel blockers, nitrates, anticoagulants and thrombolytics, antiplatlet agents and anti- arrhythmic agents
- Respiratory: beta- agonists, and steroids.
- Endocrinology; insulin, OHAs, statins, fibrates, thyroxine, carbimazole, desmopressin, glucocorticoids / mineralocorticoids and sex steroids, dopamine agonists.
- Infections: antibiotics like penicillins, cephalosporins, aminoglycosides, acyclovir, amphotericin, ketoconazole, AZT, protease inhibitors etc.
- CNS: Antiepileptic, Anti Depressant, Anti Psycotic Drug and TPA
- GI: Pro and Anti Motitlity agents and sulphasalazine,
- Rheumatology: NSAIDs, immunosuppresants and disease modifying drugs, biphosphonates, calcitonin.
- Oncology: anticancer drugs, cytotoxic drugs.
- Clinical toxicology including overdose, management of addiction, adverse drug reactions and management of anaphylaxis.
- IVIG and Biologically active drugs

Practical skills

- Being able to undertake a thorough medication review
- Being able to monitor drug therapy clinically and with laboratory assistance.

NUCLEAR MEDICINE

Theoretical knowledge

a) Cardiovascular system

♦ Understanding the principles of and indications for myocardial perfusion imaging using exercise and pharmacological stress.
♦ Understanding the role of myocardial perfusion imaging in the post infarct patient, in patients who have undergone revascularization procedures and its use in detection of viable myocardium, stunned and hibernating myocardium.

b) Respiratory system :

♦ Understanding the principles of and indications for lung ventilation and perfusion imaging.
♦ Understanding the role of contrast venography, compression ultrasound and pulmonary angiography in diagnosis of pulmonary embolism.

c) **Musculoskeletal system**

♦ Understanding the principles of and clinical indications for bone scanning with particular reference to oncology and rheumatology.
♦ Understanding the role of bone scanning in the diagnosis of disease and integration of bone scan findings with plain radiography, CT scanning and MRI.
♦ Understanding the role of therapeutic radiopharmaceuticals in palliation of pain from bone metastasis.
♦ Understanding the role of dual photon absorptiometry and its role in the diagnosis and management of osteoporosis.

d) Gastrointestinal system

♦ Understanding the principles of and indications for oesophageal motility studies; gastric emptying scans ; colon transit studies; hepatobiliary studies and gastrointestinal bleeding studies; cavernous hemangioma studies; urea breath tests and labelled white cell scans.
♦ Capapble of interpreting the results of these scans and integrating those results with the results of abdominal CT scanning and abdominal ultrasound.

e) Nephrology

♦ Understanding the principles of and indications for renal perfusion scanning, renal cortical scanning and GFR estimation.
♦ Understanding the use and limitation of pharmacological intervention (diuretics , ACE inhibitors) in dynamic renal scanning.
♦ Understanding the role of renal perfusion imaging in the detection of renovascular hypertension.

f) Hematology

♦ Understanding the principles of gallium scanning, white cell scanning, Schilling test, red blood cell volume and plasma volume estimations.
♦ Understanding the clinical indications for gallium scanning in the detection and monitoring of inflammation and malignancy.
♦ Understanding the clinical indications for white cell scanning in the detection of inflammation and infection.
♦ Understanding the role of therapeutic administration of Phosphorus-32 in the treatment of polycythemia rubra vera.

g) Neurology

♦ Understanding the principles of and indications for cerebral perfusion imaging.

h) Endocrinology

♦ Understanding the principles of and indications for thyroid and parathyroid scanning, I-131 MIBG scanning.
♦ Understanding the role of I-131 therapy in the treatment of thyrotoxicosis and thyroid cancer.

PALLIATIVE CARE

Theoretical knowledge

• Principles and philosophy of palliative care and their application in advanced disease.
• Management of emergencies in palliative care – acute confusional states, haemorrhage, acute severe pain, spinal cord compression, convulsions, SVC obstruction.
• Management of major physiologic pain syndromes like neuropathic, bone and visceral, their assessment, psychological factors, treatment and monitoring.
• Management of conditions and symptoms common in incurable and life threatening disease – Including hypercalcemia, mouth problems, anorexia, weakness, nausea and vomiting, dyspnoea, intestinal obstruction, constipation, diarrhoea, incontinence, anxiety, depression, restlessness, malignant effusion and ascites, lymphoedema.
• Pharmacology of drugs commonly used in pain control and nonpharmacological pain control measures.
• Psychosocial aspects of palliative medicine like communication with terminally ill patients, their relatives and health care professionals with respect to information transfer, therapeutic strategy; quality of life issues and their relevance in late stage disease.
• Legal and ethical issues like withholding and withdrawing life support, certification of death, procedures after death.

Practical skills

• Counseling of patients and their families on the palliative or conservative management.
• Effective use of alternative rotes of analgesia like rectal, topical, nasal and subcutaneous.
• Correct compliance with regulations pertaining to use of controlled substances in terminally ill patients.

REGENERATIVE MEDICINE

- Stem cell biology
- Hematopoietic Stem cells
- Application of Stem cell Biology in Clinical Medicine

PRAGNANCY RELATED MEDICAL DISORDER

Theoretical knowledge & Practical skills

Diagnosis, treatment & specific management strategies for gestational diabetes mellitus, diabetes mellitus, hypertension, pregnancy induced hypertension, rheumatic heart diseases, epilepsy, eclampsia, preeclampsia, anaemia, grave's disease, hypothyroidism, hepatitis, Peripartum Cardiomyopathy, Autoimmune Disorders and bronchial asthma. Safe Drug Therapy for various disorders

CRITICAL CARE AND EMERGENCY MEDICINE

- Evaluation and management of acute Respiratory, Cardiac, Renal and Hepatic Failure
- Shock and Cardiac Arrest
- Neurological Critical Care
- Evaluation and management of Comotose patient
- Ventilation Strategies
- Evaluation and Management of Shock

Nutrition and Metabolism

- Nutritional requirement Comatose or the patient on ventilator

- **Biostatistics, Research Methodology and Clinical Epidemiology**
- **Ethics**
- **Medico legal aspects relevant to the discipline**
- **Health Policy issues as may be applicable to the discipline**

Competencies

- General clinical skills- Care of in-patients, out-patients, special clinics; Maintenance of case records for both in-and out-patients; Carrying out various investigative procedures ñ log book; Learning special procedures for the diagnosis/management of patients specially knowledge/skills of basic life support; Rotation ñ inter-units/sub-specialties; Special postings : ICU, Dermatology, Radiology, Psychiatry, Pathology, etc.

- **Clinical skills** : These are essential to practice competently in adult internal medicine and include the following

  1. General verbal communication skills – These include establishment of professional relationships with patients and their relatives in order to obtain organized , relevant and complete medical histories and perform thorough physical examination.
  2. General physical examination skills – This includes the ability to perform an accurate physical and mental state examination including complex medical problems and an ability to interpret physical signs.
  3. General written communication skills – This includes ability to write clear, concise, and accurate medical history and clinical examination followed by a clear management plan. Also includes ability to write discharge summaries and transfer summaries.
  4. Patient management skills – This includes ability to interpret and integrate history and physical findings with laboratory results to arrive at diagnosis and management by use of appropriate resources , thereby avoiding unnecessary investigations and hospitalization

- **Communication skills**- Case presentations; Presentation of articles from Journals; Clinical case presentations; Attending conferences, seminars, workshops etc. for CME

- Clinical Procedures -A log book to be maintained for the various procedures done by the individuals (this may include needle aspirations from serous cavities, liver-

abscess, bone-marrow, biopsies, aspirations of liver/kidneys, muscles, skin, lymph ñ nodes and lumps)

- Diagnostics- Principles of methodology of various biochemical, microbiological, immunological, histo-chemical and radiological procedures; Knowledge about precise use and risks associated with various diagnostic procedures and their financial implication to the individual patient as well as health care provider
- To obtain written consent from the patient to understand the legal framework with in the healthcare
- Therapeutic and safe prescribing relevant to clinical practice
- Time management and decision making and clinical reasoning
- The patient should be the central focus of care
- To ensure patient safety in clinical practice
- Team working and patient safety
- To develop the ability to manage and control infection in patients including control of cross infection
- To know, understand and apply appropriately the principles, guidance and laws regarding medical ethics and confidentiality
- Manage long term diseases and promoting patient self care
- Communicate effectively and accurately with patient relatives and care givers and breaking bad news
- Health promotion and healthcare
- To progressively develop the ability to perform an audit of clinical practice and death review and medical audit

THESIS PROTOCOL & THESIS

The candidates are required to submit a thesis at the end of three years of training as per the rules and regulations of NBE.

Guidelines for Submission of Thesis Protocol & Thesis by candidates

Research shall form an integral part of the education programme of all candidates registered for DNB degrees of NBE. The Basic aim of requiring the candidates to write a thesi protocol & thesis/dissertation is to familiarize him/her with research methodology. The members of the faculty guiding the thesis/dissertation work for the candidate shall ensure that the subject matter selected for the thesis/dissertation is **feasible, economical** and **original**.

Guidelines for Thesis Protocol

The protocol for a research proposal (including thesis) is a study plan, designed to describe the background, research question, aim and objectives, and detailed methodology of the study. In other words, the protocol is the 'operating manual' to refer to while conducting a particular study.

The candidate should refer to the NBE Guidelines for preparation and submission of Thesis Protocol before the writing phase commences. The minimum writing requirements are that the language should be clear, concise, precise and consistent without excessive adjectives or adverbs and long sentences. There should not be any redundancy in the presentation.

The development or preparation of the Thesis Protocol by the candidate will help her/him in understanding the ongoing activities in the proposed area of research. Further it helps in creating practical exposure to research and hence it bridges the connectivity between clinical practice and biomedical research. Such research exposure will be helpful in improving problem solving capacity, getting updated with ongoing research and implementing these findings in clinical practice.

Research Ethics: Ethical conduct during the conduct and publication of research is an essential requirement for all candidates and guides, with the primary responsibility of ensuring such conduct being on the thesis guide. Issues like Plagiarism, not maintaining the confidentiality of data, or any other distortion of the research process will be viewed seriously. The readers may refer to standard documents for the purpose.

The NBE reserves the right to check the submitted protocol for plagiarism, and will reject those having substantial duplication with published literature.

PROTOCOL REQUIREMENTS

1. All of the following will have to be entered in the online template. The thesis protocol should be restricted to the following word limits.

- Title : 120 characters (with spacing) page
- Synopsis [structured] : 250-300
- Introduction : 300-500
- Review of literature : 800-1000
- Aim and Objectives : Up to 200
- Material and Methods : 1200-1600
- 10-25 References [ICMJE style]

2. It is mandatory to have ethics committee approval before initiation of the research work. The researcher should submit an appropriate application to the ethics committee in the prescribed format of the ethics committee concerned.

Guidelines for Thesis

1. The proposed study must be approved by the institutional ethics committee and the protocol of thesis should have been approved by NBE.

2. The thesis should be restricted to the size of 80 pages (maximum). This includes the text, figures, references, annexures, and certificates etc. It should be printed on both sides of the paper; and every page has to be numbered. Do not leave any page blank. To achieve this, following points may be kept in view:

    a. The thesis should be typed in 1.5 space using Times New Roman/Arial/ Garamond size 12 font, 1" margins should be left on all four sides. Major sections viz., Introduction, Review of Literature, Aim & Objectives, Material and Methods, Results, Discussion, References, and Appendices should start from a new page. Study proforma (Case record form), informed consent form, and patient information sheet may be printed in single space.
    b. Only contemporary and relevant literature may be reviewed. Restrict the introduction to 2 pages, Review of literature to 10-12 pages, and Discussion to 8-10 pages.
    c. The techniques may not be described in detail unless any modification/innovations of the standard techniques are used and reference(s) may be given.
    d. Illustrative material may be restricted. It should be printed on paper only. There is no need to paste photographs separately.

3. Since most of the difficulties faced by the residents relate to the work in clinical subject or clinically-oriented laboratory subjects, the following steps are suggested:

a. The number of cases should be such that adequate material, judged from the hospital attendance/records, will be available and the candidate will be able to collect case material within the period of data collection, i.e., around 6-12 months so that he/she is in a position to complete the work within the stipulated time.
b. The aim and objectives of the study should be well defined.
c. As far as possible, only clinical/laboratory data of investigations of patients or such other material easily accessible in the existing facilities should be used for the study.
d. Technical assistance, wherever necessary, may be provided by the department concerned. The resident of one specialty taking up some problem related to some other specialty should have some basic knowledge about the subject and he/she should be able to perform the investigations independently, wherever some specialized laboratory investigations are required a co-guide may be co-opted from the concerned investigative department, the quantum of laboratory work to be carried out by the candidate should be decided by the guide & co-guide by mutual consultation.

4. The clinical residents are not ordinarily expected to undertake experimental work or clinical work involving new techniques, not hitherto perfected OR the use of chemicals or radioisotopes not readily available. They should; however, be free to enlarge the scope of their studies or undertake experimental work on their own initiative but all such studies should be feasible within the existing facilities.

5. The DNB residents should be able to freely use the surgical pathology/autopsy data if it is restricted to diagnosis only, if however, detailed historic data are required the resident will have to study the cases himself with the help of the guide/co-guide. The same will apply in case of clinical data.

6. Statistical methods used for analysis should be described specifically for each objective, and name of the statistical program used mentioned.

General Layout of a DNB Thesis:

- **Title-** A good title should be brief, clear, and focus on the central theme of the topic; it should avoid abbreviations. The Title should effectively summarize the proposed research and should contain the PICO elements.
- **Introduction-** It should be focused on the research question and should be directly relevant to the objectives of your study.

- **Review of Literature -** The Review should include a description of the most relevant and recent studies published on the subject.

- Aim and Objectives - The ‘Aim’ refers to what would be broadly achieved by this study or how this study would address a bigger question / issue. The ‘Objectives’ of the research stem from the research question formulated and should at least include participants, intervention, evaluation, design.

- **Material and Methods-** This section should include the following 10 elements: Study setting (area), Study duration; Study design (descriptive, case-control, cohort, diagnostic accuracy, experimental (randomized/non-randomized)); Study sample (inclusion/exclusion criteria, method of selection), Intervention, if any, Data collection, Outcome measures (primary and secondary), Sample size, Data management and Statistical analysis, and Ethical issues (Ethical clearance, Informed consent, trial registration).

- **Results-** Results should be organized in readily identifiable sections having correct analysis of data and presented in appropriate charts, tables, graphs and diagram etc.

- **Discussion–**It should start by summarizing the results for primary and secondary objectives in text form (without giving data). This should be followed by a comparison of your results on the outcome variables (both primary and secondary) with those of earlier research studies.

- **Summary and Conclusion-** This should be a précis of the findings of the thesis, arranged in four paragraphs: (a) background and objectives; (b) methods; (c) results; and (d) conclusions. The conclusions should strictly pertain to the findings of the thesis and not outside its domain.

- **References-** Relevant References should be cited in the text of the protocol (in superscripts).

- **Appendices -**The tools used for data collection such as questionnaire, interview schedules, observation checklists, informed consent form (ICF), and participant information sheet (PIS) should be attached as appendices. Do not attach the master chart.

Thesis Protocol Submission to NBE

1. DNB candidates are required to submit their thesis protocol within 90 days of their joining DNB training.

2. Enclosures to be submitted along with protocol submission form:
    a) Form for Thesis Protocol Submission properly filled.
    b) Thesis Protocol duly signed.
    c) Approval letter of institutional Ethical committee. *(Mandatory, non receivable of any one is liable for rejection)*

Thesis Submission to NBE

1. As per NBE norms, writing a thesis is essential for all DNB candidates towards partial fulfillment of eligibility for award of DNB degree.
2. DNB candidates are required to submit the thesis before the cut-off date which shall be 30th June of the same year for candidates appearing for their scheduled December final theory examination. Similarly, candidates who are appearing in their scheduled June DNB final examination shall be required to submit their thesis by 31st December of preceding year.
3. Candidates who fail to submit their thesis by the prescribed cutoff date shall NOT be allowed to appear in DNB final examination.
4. Fee to be submitted for assessment (In INR): 3500/-
5. Fee can be deposited ONLY through pay-in-slip/challan at any of the Indian bank branch across India. The challan can be downloaded from NBE website www.natboard.edu.in
6. Thesis should be bound and the front cover page should be printed in the standard format. A bound thesis should be accompanied with:
    a. A Synopsis of thesis.
    b. Form for submission of thesis, duly completed
    c. NBE copy of challan (in original) towards payment of fee as may be applicable.
    d. Soft copy of thesis in a CD duly labeled.
    e. Copy of letter of registration with NBE.

7. A declaration of thesis work being bonafide in nature and done by the candidate himself/herself at the institute of DNB training need to be submitted bound with thesis. It must be signed by the candidate himself/herself, the thesis guide and head of the institution, failing which thesis shall not be considered.

The detailed guidelines and forms for submission of Thesis Protocol & Thesis are available at www.natboard.edu.in.thesis.php.

LOG BOOK

A candidate shall maintain a log book of operations (assisted / performed) during the training period, certified by the concerned post graduate teacher / Head of the department / senior consultant.

This log book shall be made available to the board of examiners for their perusal at the time of the final examination.

The log book should show evidence that the before mentioned subjects were covered (with dates and the name of teacher(s) The candidate will maintain the record of all academic activities undertaken by him/her in log book .

1. Personal profile of the candidate
2. Educational qualification/Professional data
3. Record of case histories
4. Procedures learnt
5. Record of case Demonstration/Presentations
6. Every candidate, at the time of practical examination, will be required to produce performance record (log book) containing details of the work done by him/her during the entire period of training as per requirements of the log book. It should be duly certified by the supervisor as work done by the candidate and countersigned by the administrative Head of the Institution.
7. In the absence of production of log book, the result will not be declared.

Leave Rules

1. DNB Trainees are entitled to leave during the course of DNB training as per the Leave Rules prescribed by NBE.
2. A DNB candidate can avail a maximum of 20 days of leave in a year excluding regular duty off/ Gazetted holidays as per hospital/institute calendar/policy.
3. MATERNITYLEAVE:
    a. Afemale candidate is permitted a maternity leave of 90 days once during the entire duration of DNB course.
    b. The expected date of delivery (EDD) should fall within the duration of maternity leave.
    c. Extension of maternity leave is permissible only for genuine medical reasons and after prior approval of NBE. The supporting medical documents have to be certified by the Head of the Institute/hospital where the candidate is undergoing DNB training. NBE reserves its rights to take a final decision in such matters.
    d. The training of the candidate shall be extended accordingly in case of any extension of maternity leave being granted to the candidate.
    e. Candidate shall be paid stipend during the period of maternity leave. No stipend shall be paid for the period of extension of leave.
4. Male DNB candidates are entitled for paternity leave of maximum of one week during the entire period of DNB training.
5. No kind of study leave is permissible to DNB candidates. However, candidates may be allowed an academic leave as under across the entire duration of training program to attend the conferences/CMEs/Academic programs/Examination purposes.

DNB COURSE	NO. OF ACADEMIC LEAVE
DNB 3 years Course (Broad & Super Specialty)	14 Days
DNB 2 years Course (Post Diploma)	10 Days
DNB Direct 6 years Course	28 days

6. Under normal circumstances leave of one year should not be carried forward to the next year. However, in exceptional cases such as prolonged illness the leave across the DNB training program may be clubbed together with prior approval of NBE.
7. Any other leave which is beyond the above stated leave is not permissible and shall lead to extension/cancellation of DNB course.
8. Any extension of DNB training for more than 2 months beyond the scheduled completion date of training is permissible only under extra-ordinary circumstances with prior approval of NBE. Such extension is neither automatic nor shall be granted as a matter of routine. NBE shall consider such requests on merit provided the seat is not carried over and compromise with training of existing trainees in the Department.
9. Unauthorized absence from DNB training for more than 7 days may lead to cancellation of registration and discontinuation of the DNB training and rejoining shall not be permitted.
10. Medical Leave
    a. Leave on medical grounds is permissible only for genuine medical reasons and NBE should be informed by the concerned institute/hospital about the same immediately after the candidate proceeds on leave on medical grounds.
    b. The supporting medical documents have to be certified by the Head of the Institute/hospital where the candidate is undergoing DNB training and have to be sent to NBE.
    c. The medical treatment should be taken from the institute/ hospital where the candidate is undergoing DNB training. Any deviation from this shall be supported with valid grounds and documentation.
    d. In case of medical treatment being sought from some other institute/hospital, the medical documents have to be certified by the Head of the institute/hospital where the candidate is undergoing DNB training.

e. NBE reserves its rights to verify the authenticity of the documents furnished by the candidate and the institute/hospital regarding Medical illness of the candidate and to take a final decision in such matters.

11.

a. Total leave period which can be availed by DNB candidates is 120+28 = 148 days for 6 years course, 60+14=74 days for 3 years course and 40+10 = 50 days for 2 years course. This includes all kinds of eligible leave including academic leave. Maternity / Paternity leave can be availed separately by eligible candidates. Any kind of leave including medical leave exceeding the aforementioned limit shall lead to extension of DNB training. It is clarified that prior approval of NBE is necessary for availing any such leave.

b. The eligibility for DNB Final Examination shall be determined strictly in accordance with the criteria prescribed in the respective information bulletin.

EXAMINATION

FORMATIVE ASSESSMENT

Formative assessment includes various formal and informal assessment procedures by which evaluation of student's learning, comprehension, and academic progress is done by the teachers/ faculty to improve student attainment. Formative assessment test (FAT) is called as "Formative "as it informs the in process teaching and learning modifications. FAT is an integral part of the effective teaching .The goal of the FAT is to collect information which can be used to improve the student learning process.

Formative assessment is essentially positive in intent, directed towards promoting learning; it is therefore part of teaching. Validity and usefulness are paramount in formative assessment and should take precedence over concerns for reliability. The assessment scheme consists of Three Parts which has to be essentially completed by the candidates.

The scheme includes:-

Part I:- Conduction of theory examination
Part-II :- Feedback session on the theory performance
Part-III :- Work place based clinical assessment

Scheme of Formative assessment

PART – I	**CONDUCT OF THEORY EXAMINATION**	Candidate has to appear for Theory Exam and it will be held for One day.
PART – II	**FEEDBACK SESSION ON THE THEORY PERFORMANCE**	Candidate has to appear for his/her Theory Exam Assessment Workshop.
PART – III	**WORK PLACE BASED CLINICAL ASSESSMENT**	After Theory Examination, Candidate has to appear for Clinical Assessment.

The performance of the resident during the training period should be monitored throughout the course and duly recorded in the log books as evidence of the ability and daily work of the student

1. Personal attributes:

- **Behavior and Emotional Stability:** Dependable, disciplined, dedicated, stable in emergency situations, shows positive approach.
- **Motivation and Initiative:** Takes on responsibility, innovative, enterprising, does not shirk duties or leave any work pending.

- **Honesty and Integrity:** Truthful, admits mistakes, does not cook up information, has ethical conduct, exhibits good moral values, loyal to the institution.
- **Interpersonal Skills and Leadership Quality:** Has compassionate attitude towards patients and attendants, gets on well with colleagues and paramedical staff, is respectful to seniors, has good communication skills.

2. Clinical Work:

- **Availability:** Punctual, available continuously on duty, responds promptly on calls and takes proper permission for leave.
- **Diligence:** Dedicated, hardworking, does not shirk duties, leaves no work pending, does not sit idle, competent in clinical case work up and management.
- **Academic ability:** Intelligent, shows sound knowledge and skills, participates adequately in academic activities, and performs well in oral presentation and departmental tests.
- **Clinical Performance:** Proficient in clinical presentations and case discussion during rounds and OPD work up. Preparing Documents of the case history/examination and progress notes in the file (daily notes, round discussion, investigations and management) Skill of performing bed side procedures and handling emergencies.

3. Academic Activity: Performance during presentation at Journal club/ Seminar/ Case discussion/Stat meeting and other academic sessions. Proficiency in skills as mentioned in job responsibilities.

FINAL EXAMINATION

The summative assessment of competence will be done in the form of DNB Final Examination leading to the award of the degree of Diplomate of National Board in General Medicine. The DNB final is a two-stage examination comprising the theory and practical part. An eligible candidate who has qualified the theory exam is permitted to appear in the practical examination.

Theory Examination

1. The theory examination comprises of ***Three/ Four*** papers, maximum marks 100 each.
2. There are 10 short notes of 10 marks each, in each of the papers. The number of short notes and their respective marks weightage may vary in some subjects/some papers.
3. Maximum time permitted is 3 hours.
4. Candidate must score at least 50% in the aggregate of ***Three/ Four*** papers to qualify the theory examination.

5. Candidates who have qualified the theory examination are permitted to take up the practical examination.
6. The paper wise distribution of the Theory Examination shall be as follows:

Paper I: Basic Sciences of Medicine
Paper II: Practice and Principle of Medicine
Paper III: Specialties associated with Medicine
Paper IV: Recent Advances of General Medicine

a) Practical Examination:

1. Maximum Marks: 300.
2. Comprises of Clinical Examination and Viva.
3. Candidate must obtain a minimum of 50% marks in the Clinical Examination (including Viva) to qualify for the Practical Examination.
4. There are a maximum of three attempts that can be availed by a candidate for Practical Examination.
5. First attempt is the practical examination following immediately after the declaration of theory results.
6. Second and Third attempt in practical examination shall be permitted out of the next three sessions of practical examinations placed alongwith the next three successive theory examination sessions; after payment of full examination fees as may be prescribed by NBE.
7. Absentation from Practical Examination is counted as an attempt.
8. Appearance in first practical examination is compulsory;
9. Requests for Change in center of examination are not entertained, as the same is not permissible.
10. Candidates are required not to canvass with NBE for above.

Declaration of DNB Final Results

1. DNB final is a qualifying examination.
2. Results of DNB final examinations (theory & practical) are declared as PASS/FAIL.
3. DNB degree is awarded to a DNB trainee in the convocation of NBE.

RECOMMENDED TEXT BOOKS AND JOURNALS

Core Books

- Hutchinson's Clinical Methods
- Harrison's Principle of Medicine
- API Textbook of Medicine
- Mcleod Method of Clinical Examination
- DeJong's Neurological Examination
- Bickerstaff's Neurological Examination in Clinical Practice

Reference Books

- Braunwald's Heart Disease
- Hurst's The Heart
- Sheila Sherlock's Diseases of the Liver and Biliary System
- Adams and Victor's Principle of Neurology
- Crofton and Douglas Respiratory Diseases
- Shamroth's An Introduction to Electrocardiology

Journals

Journal of Association of Physician of India Neurology India
Indian Heart Journal
Indian journal of gastroentrology
Diabetes Care
JIACM

International

New England journal of medicine
British journal of Medicine
Lancet
Post graduate Journal of Medicine
GUT

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