

SAMBALPUR UNIVERSITY
JYOTIVIHAR, BURLA, SAMBALPUR, ODISHA-768019



MD/MS SYLLABUS & CURRICULUM

2012

(effected from Academic Session 2012-13 and MD/MS Examinations of 2013)

SHORT TITLE AND COMMENCEMENT

1. a. These regulations may be called “MD/MS Syllabus & Curriculum -2012”.
1. b. They shall come into force on the date of their publication from the session 2012-13 (i.e. MD/MS Examinations of 2013.)
1. c. This will supersede all the previous regulations of the university in the context cited.

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Syllabus and Curriculum for **MD - ANATOMY** 2012

Goal:-

The goal of study of MD Anatomy is to prepare the student to be a competent anatomist who can teach UG students every aspect of anatomical sciences, plan and modified UG curriculum, embalm a cadaver, design gross and histological laboratory and implement research programme.

Objectives:-

A candidate at the end of three years PG training programme in anatomy should be able to –

1. Acquire knowledge of structure of human body from gross to molecular level and correlate it with the function
2. Acquire knowledge of basic principles of normal growth and differentiation. Understand critical periods of human growth and development. Analyze congenital malformations, know the etiological factors including genetic mechanisms involve in abnormal development.
3. Have comprehensive knowledge of basic structure and function of the nervous system.
4. Plan and implement teaching programmes for UG medical students. To be able to use different teaching methods and modern learning resources for UG teaching.
5. Develop attitude of scientific enquiry and learn research technique and to be familiar with research scientific advances.

Methods of training:-

- Students everyday attend dissection classes during dissection hour and they involved in small group teaching session.
- Attend the histological practical classes and demonstrate histology slides to the UG students.
- Attend weekly seminar, journal club, discussion
- Involved in research activity and they discuss with the guide and co-guide in time to time interval
- Maintain log book pertaining to the work under taken

SYLLABUS (COURSE CONTENT):

THE THEORY SHALL BE OF FOUR PAPERS

- paper-I : general anatomy, gross anatomy, radiological anatomy.
paper-II : embryology, genetics, histology.
paper-III : neuroanatomy.
paper-IV : applied anatomy and recent advances.

PAPER I

General anatomy

- Tissues of the body.
- General Osteology.
- Arthrology.
- Muscle & Fascia.
- Nervous system.
- Principles governing arterial, venous and lymphatics pathways.
- Innervations of blood vessels.

Gross anatomy

- Detailed gross anatomy of the human body, including cross sectional anatomy, anatomical basis of clinical conditions.
- Embalming and museum techniques.

Radiological anatomy

- Principles involved in plain radiography.
- Special investigative procedures and newer imaging techniques such as ultrasound, C-T scans, M.R.I, PET etc.

PAPER II

Embryology

- General embryology.
- Special embryology of all the systems of the body including variations and congenital anomalies.

Genetics

- Structures of chromosomes .
- Structure of genes.
- Karyotype .
- Chromosomal aberrations.
- Inheritance.
- Basic molecular genetics.
- Common genetics disorders.

Histology

- Histological and museum techniques.
- Microscopes all types.
- Care and maintenance of light microscope.
- General histology.
- Special histology of the systems of the body including their electron microscopic appearance.
- Preparation and processing of tissue for histological study.

PAPER III

Neuroanatomy

- Structural organization of various parts of nervous system with particular reference to their connections and functions.
- Localization and effect of lesions in different parts of the central nervous system and nerve injuries.
- Cross section of brain at various levels.
- Ventricles of brain.
- Cranial nerves, connections, functions and distributions.

PAPER IV

Applied anatomy including radio anatomy and recent advances

- Applied aspects of human anatomy including surgical approaches to various structures and organs.
- Principles of newer imaging techniques.
- Determination of age, sex and race from skeletal remains.
- Determination of age of a living individual.
- Application of anatomical knowledge in fertility control.
- Immunological basis of tissue typing and organ transplant.
- Sectional anatomy.
- Principles and interpretation of CT Scan, Sonography and M.R.I.
- Surface anatomy.
- Museum techniques.
- Recent advances in medical sciences.
- Embalming techniques including medico-legal aspects.

DETAILS OF SKILLS TO BE ACQUIRED DURING THE TRAINING PERIOD:-

- Communication skills- by attending Journal club and seminars
- Teaching experience- by taking UG classes (demonstration and practical)
- Skills in technique in micro, neuro, gross anatomy, embryology, histo chemistry, genitics

GUIDE LINES FOR WRITING THESIS:-

- Every candidate shall carry out work on an assigned research project under the guidance of a recognized Postgraduate Teacher, the project shall be written and submitted in the form of a Thesis
- Every candidate shall submit thesis plan to the university as per university guidelines
- Thesis shall be submitted to the university as per university guidelines.
 - (i) The student will Identify a relevant research question;
 - (ii) conduct a critical review of literature;
 - (iii) formulate a hypothesis;

- (iv) determine the most suitable study design;
- (v) state the objectives of the study;
- (vi) prepare a study protocol ;
- (vii) undertake a study according to the protocol;
- (viii) analyze and interpret research data, and draw conclusions;
- (ix) write a research paper.

Inter-Departmental Rotational Postings

<u>Postings</u>	<u>Period</u>
Radiology	2 weeks

TRAINING CALENDER- ACADEMIC TERM WISE:-

First year of training

- Gross anatomy 12 hours per week
- Histology 4 hours/week
- Preparation of research protocol 2 hours/week

Second year of training

- Teaching gross and applied anatomy to first year MBBs student during dissection hours on all working days
- Demonstration of bones(4 hrs/wk) and histology slides(4hrs/wk)
- Evaluation of test conducted for 1st year students (Theory/Oral /Practical)
- Seminar and journal Club (1hr/wk)
- Laboratory skill – embalming of cadavers, tussue processing & stainig, museum technique
- Maintaiance of log book
- Discussion with guide and co-guide about their research work

Third year of training:-

- UG teaching 12 hr/wk
- Research work
- Presentation and Publication of research paper

Assessment:-

General Principles

- The assessment should be valid, objective, and reliable.
- It must cover cognitive, psychomotor and affective domains.
- Formative, continuing and summative (final) assessment should be conducted in theory as well as practicals/clinicals. In addition, thesis should be assessed separately.

Overall Weightage

Internal assessment - 20%

Final summative examination - 80%

Formative assessment

The formative assessment should be continuous as well as end-of-term. The former should be based on the feedback from the senior residents and the unit faculty concerned. End-of-term assessment should be held at the end of each semester (upto the 5th semester). Formative assessment will not count towards pass/fail at the end of the program, but will provide feedback to the candidate. Scheme of internal

assessment examination It is held by means of a written test and practical (and or clinical) with viva examination by all consultants of the department as per distribution of marks as follows. In such five six monthly tests a candidate shall be evaluated for 1000 marks in total i.e. 200 marks in each term as follows.

Item	1st term	2nd term	3rd term	4th term	5th term
Theory	75 marks	75 marks	75 marks	75 marks	75 marks
Oral, Practical/clinical	75 marks	75 marks	75 marks	75 marks	75 marks
Log book evaluation	50 marks	50 marks	50 marks	50 marks	50 marks
Total	200 marks	200 marks	200 marks	200 marks	200 marks
Gross total	1000 marks				
Carried forward to Final MD/MS Examination	20 % marks ~ 200 marks				

200 marks shall be carried over a period of five terms as follows.

- Log book evaluation- 10 x 5terms= 50 marks
- Theory exam 15 x 5terms= 75 marks
- Oral ,Practical/Clinical exam 15 x 5terms= 75 marks

Evaluation of the Log book:

Each candidate should be required to maintain a log book in which following details will be entered and evaluated on a scale of 1 to 10. At end of each term of 6months of training for 5such terms the logbook will be evaluated and a score is to be calculated out from a maximum of 100 marks for the 10 items as entered in the logbook.

- i. skills learned independently, under supervision or assisted by him.1 to 10
- ii. Presentations in journal clubs1 to 10.
- iii. Cases presented in clinical meetings 1 to 10
- iv. Presentation in departmental seminars..... 1 to 10
- v. Intra and interdepartmental training and evaluation details.....1 to 10
- vi. Teaching activities.....1 to 10
- vii. Conferences/workshops/CME attended 1 to 10
- viii. Papers presented/published conferences.....1 to 10
- ix. Didactic lectures attended.....1 to 10
- x. Thesis progress and evaluation details.....1 to 10

MD Examination:

Pattern of question for theory Papers- There shall be four theory papers. One paper out of these shall be on 'Basic Medical Sciences' and one paper on 'Recent Advances' in the discipline. There shall be 100 marks for each paper to be answered in 3 hours' time. There shall be '1 structured essay type question' for 20 marks besides 8'short essay type questions' for 10 marks each in each paper.

Days of practical examination-Practical Examination should be conducted for a batch of upto 8 candidates over a minimum period of two to three days extendable up to 7days subject to the subject curriculum with due approval of the board of examiners. For a batch of more than 8 the examination may extend accordingly. The theory papers shall be evaluated at the examination center itself before commencement of the practical/clinical and oral examination in the subject during these practical examination days.

Components of examination-It consist of a written examination, a practical examination to assess the clinical/practical competencies and skills, and a viva voce examination.

The examinations shall consist of

- A) theory
- B) practical including clinical
- C) oral

A.Theory-

The 4 papers in theory shall be conducted well in advance before the oral , clinical/practical examination.

B. Practical

Clinical/Practical examination is the most important part of the evaluation and is aimed at assessing the clinical/practical skills of the candidate and diagnostic reasoning. Entirely objective evaluation of these skills is neither feasible nor desirable. However, in order to test the various skills, the examiners may evaluate the candidates on a structured format.

C. Pedagogic Skill

The candidate shall be allotted a topic from the discipline at a short notice of few hours, (preferably on the first day of the examination) to prepare and present before the board of examiners within a time span of 15 minutes (preferably on the second day of the examinations) . The teaching skill will be evaluated under various points(as illustrated below) and marks given accordingly.

- (i) Choice of article/topic (unless specifically allotted)
- (ii) Completeness of presentation
- (iii) Clarity of presentation
- (iv) Understanding of the subject and ability to convey the same
- (v) Whether relevant references have been consulted
- (vi) Ability to convey points in favour and against the subject under discussion
- (vii) Use of audio-visual aids
- (viii) Ability to answer questions
- (ix) Time scheduling
- (x) Overall performance

D. Viva-Voce

a.Viva-voce is expected to be conducted at every stage of the practical examination. The resident will be required to answer oral questions on any aspect of the specialty. Oral examination is designed to test the general scientific background of the candidate and his/her own particular contribution embodied by the thesis. A formal "grand viva-voce" may be held at the end of the practical examination. Questions on the thesis/dissertation may be asked at this time as well. The board of examiners will conduct the examination. They will read out the comments & questions and will seek the answers from the candidate. The viva voce should be assessed under the following headings:

1. Thesis viva voce
2. Grand viva voce

All examiners shall be jointly responsible for all parts of the examination. In presence of the external examiners, the Chairman of the conducting board shall make the necessary arrangements for conducting the oral and practical including clinical examination at the department in the college centre .

b. The candidate shall bring the logbook and a copy of his/her thesis mandatorily while appearing for the oral, practical and clinical examination.

Marks for examinations: The examinations shall be organized on the basis of marking system to evaluate and certify candidate's level of knowledge, skill and competence as per distributions mentioned below. In total the overall assessment for a postgraduate shall be for 1000 marks distributed as follows.

A. Internal assessment exam (200 marks)

- Theory 15x5=75
- Practical (Oral, clinical and practical) 15x5=75
- Log book evaluation 10x5=50
- Total : 40x5=200

B. Final MD/MS exam (800 marks)

- Theory (100 x 4 Papers) 400
- Oral ,Clinical/Practical 400
- I) Clinical/Practical (300 marks)
 - Long exercise (one) 80 marks
 - Short exercise (three) 120 marks
 - OSPE(ten) 40 marks
 - Spots(ten) 40 marks
 - Pedagogic skill 20 marks
- II) Viva (100 marks)
 - Thesis Viva 20 marks
 - Grand Viva 80 marks

Grand Total (A+B)= 1000 marks

PASS/FAIL- In order to pass the examination in each subject a candidate must secure not less than 50% marks in each head of passing which shall include (1) Theory (2) Practical including clinical and viva voce examination (3) internal assessment examination.

Pattern of Questions;-

The PG examination shall be carried out in three parts:-

Theory :-

- There shall be 4 papers with 100 marks for 3 hours duration of examination each.
- There shall be 2 structured essay type questions for 15 marks each along with 7 short answer type questions for 10 marks each in each paper.
- The chapter distribution for the papers shall be as follows.
 - paper-I : general anatomy, gross anatomy, radiological anatomy.
 - paper-II : embryology, genetics, histology.
 - paper-III : neuroanatomy.
 - paper-IV : applied anatomy and recent advances.

Thesis:- to be submitted by each candidate at least six month before the date of commencement of theory examination

Practicals:- Should be spread over two days

1st days:- a. Gross anatomy-dissection

b. Histology Spotting (10 spots)

Technique- section cutting from one block staining one paraffin section

2nd days:- a. Micro teaching

b. Viva of dissertation and research methodology

c. grand Viva including radiological anatomy, surface anatomy, living anatomy and case/problem solving

1. SUGGESTED LIST OF BOOKS AND JOURNALS:-

- Medical Embryology – Jan Langman.
- Developing Human – Moore.
- Genetics in Medicine – J.S. Thompson & M.W. Thompson.
- Research how to plan, speak and write about it – C. Hawkins and M. Sorgi.
- How to write and publish a scientific paper- R.A. Day.
- Human Embryology – W. J. Hemilton & H.W. Mossman.
- An introduction to biostatistics. A manual for students in health sciences – P.S.S. Sundar Rao.
- Gray's Anatomy.
- Anatomy-Regional and applied – R.J. Last.
- Clinical Neuroanatomy. - Snells.
- Anatomy for Surgeons. - W.H. Hollinshead, Vol I, II & III.
- Tissue of the body .- Lee Gross Clerk.
- Wheater Functional Histology – Young's
- Carlton's Histological techniques. – Drury R.A.B., Wallington E.A.
- Hams Histology.

Journals.

- Journal of Anatomical Society of India.
- Journal of Anatomy London.
- Anatomical Record.
- American Journal of Anatomy.
- Clinical Adjuncts.
- Anatomical Adjuncts.
- Cell, Tissue and Organs (Formerly Acta Anatomica)

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Syllabus and Curriculum for **MD - ANAESTHESIA** 2012

At the end of three years of training as residents in anaesthesia, the candidates should be fully conversant with theory and practical aspects of –

1. Human Anatomy and Physiology

Various organ systems and cellular components in relation to Anaesthesia including muscles, neuromuscular junction, nerve plexuses, cardiovascular, respiratory, neurological, hepatobiliary, renal, endocrine and temperature homeostasis, theories of mechanism of production of anaesthesia, changes during pregnancy, various tests/investigations to evaluate the functional status of organ systems as applied to Anaesthesia Management, Intensive Care Practice and Pain Relief.

2. Pharmacology

As applied to Anaesthesia, Intensive Care Practice and Pain Relief including General Pharmacological Principles, Pharmacokinetics and Pharmacodynamics of Anaesthetic Drugs (including Uptake and Distribution of Inhaled Anaesthesia agents and All the Adjuncts used in Anaesthesia, Drugs used for treatment of various Diseases and Drug Interaction.

3. Pathophysiology of various diseases

Including disorders of cardiovascular, respiratory, neurological, hepatobiliary, renal, endocrine and immune systems, various tests/investigations to grade/measure the disease process of various organ systems as applied to anaesthesia management, intensive care practice and pain relief.

4. Medicine

As applied to the practice of Anaesthesia including diagnosis and management of Diabetes, Hypertension, Bronchial Asthma, Chronic Obstructive Pulmonary Diseases, Respiratory Failure, ARDS, Myocardial Ischemia / Infarction, Arrhythmia, Shock, Congestive Heart Failure, Acute / Chronic Renal Failure, Head Injury, Unconscious patients, Status Epilepticus / Asthmaticus, Endocrine Disorders, Diseases related to Dysfunction of Hepatobiliary, Muscular, Connective Tissues and Immune system, Management of Perioperative Infection, Neuromuscular Disorders, Poisoning etc. and interpretation of ECG / Blood Gases / Other Biochemical Values and Function Tests.

5. Physics

As applied to Anaesthetic gases, vapours, anaesthesia machine, breathing systems, monitors, ventilators, therapeutic devices & other relevant equipment including physical principles involved in their construction and functioning.

6. Medico-Legal & Ethical aspects:

- Consent, Informed consent,
- Medical Negligence,
- Consumer Protection Act.
- Physician's Professional Behavior and Interaction.

7. Perioperative Anaesthesia management Including pre-operative evaluation, intra-operative management as well as postoperative care, monitoring (invasive as well as non-invasive) as applied to various surgical specialities and age groups.

8. Theory and practice of various techniques / aspects of Routine & Emergency cases of General Anaesthesia (e.g., Intravenous / Inhalational, Endotracheal / Mask / LMA / COPA, Spontaneous/Controlled mode of ventilation, induced hypotension / hypothermia etc.), Regional Blocks (Spinal, Epidural & Peripheral Nerve block) and Local Anaesthesia, including various postures required for anaesthetic/surgical procedures, their effects and Recent Advances for most minor to supra major surgeries in the field of:

General surgery:

Minor cases like haemorrhoidectomy to supra major cases like Liver transplant.

Gynaecology and Obstetrics

ENT and Head & Neck

Orthopaedics

Ophthalmology

Pediatric & Neonate

Differences between adult and pediatric Anatomy, Physiology, Pharmacology, Anaesthesia principles, pediatric/neonatal emergencies, postoperative care, fluid & ventilator management etc.

Cardiac, Vascular & Thoracic

Conduct of closed heart as well as open heart surgeries (Valvular, Ischemic, Congenital -Cyanotic & Acyanotic), CABG (including off pump), Pulmonary Cases (Insertion of Double Lumen Tube, one lung anaesthesia), Thymus and Vascular surgeries etc. Ability to go on Cardiopulmonary bypass and disconnect from bypass, Ability to take, manage and interpret Arterial, Central Venous and P.A. Lines, postoperative care, management of re-explorations etc.

Neurosurgery

Ability to monitor ICP, Management of head injuries, bleeds, tumours, etc with raised ICP. Ability to safely manage cases in sitting, prone, lateral, jack-knife positions and Anaesthetic management for neuroradiology procedures.

Urology

Management of endoscopic surgeries like TURP/TURBT etc, Problems related to TURP, extracorporeal shock wave lithotripsy, percutaneous placement of nephrostomy etc., anaesthetic management of patients with acute and chronic renal failure, anaesthetic management of renal transplant cases of donor as well as recipient.

Plastic

Management of burns contractures, congenital faciomaxillary abnormalities like cleft lip and palate, faciomaxillary injuries like fracture mandible, maxilla, zygoma, panfacial fractures, difficult intubations, microvascular surgeries, reconstructive surgeries, aesthetic surgeries etc.

Dental

Monitored Anaesthesia Care, Anaesthetic management of pedodontia patients, maxillofacial surgeries including TMJ Ankylosis, Awake, Retrograde & Fiberoptic intubations.

Endoscopies / laparoscopies

Anaesthetic management, specific requirement and complications of various endoscopies like cystoscopy, ureteroscopy, PCNL, hysteroscopy, thoracoscopy, mediastinoscopy etc. and Lap. Assisted/laparoscopic surgery like hysterectomy, tube ligation, appendectomy, cholecystectomy etc.

Anaesthesia for various diagnostic, therapeutic and specialized procedures.

Anaesthesia for Geriatric patients.

Anaesthesia / Sedation techniques out side operating room

Electroconvulsive shock therapy (ECT), Electrophysiologic tests, Radiofrequency ablation, Cardioversion, Cardiac catheterization, Special anaesthetic considerations in radiology and interventional radiology related to Dye allergies, Embolization, monitoring / Equipment options in the MRI suite.

8. History of Anaesthesia

9. Airway Management

Assessment of difficult airway, Awake, Retrograde, Use of intubating LMA's, Intubating Stylets, Various laryngoscopes designated for difficult airway, Insertion of Combitube, Ability to perform Cricothyrotomy and use of Venturi, Minitrach & Fiberoptic intubations etc.

10. Basic & Advanced Cardiopulmonary & Cerebral Resuscitation (CPCR)

For all age group of patients under different situations e.g., neonates, pregnant females, poisoning cases, trauma victims etc.

11. Acid base & Fluid management Including use of Crystalloids, Colloids, blood & blood products.

12. Arterial, Central Venous and P.A. Lines Establishment, management and interpretation.

13. Anaesthetic drugs used in perioperative care

14. Equipments (Minor to advanced monitoring) – Their use, maintenance, sterilisation and care.

15. Medical gases Knowledge of Manufacturing, Storage and Central pipeline Systems.
16. Day Care / Outpatient Anaesthesia.
17. Remote Location Anaesthesia: Anaesthetic practice during disasters and for large turnover surgeries in camps / mass casualties.
18. Emergency Anaesthesia.
19. Monitored Anaesthesia Care.
20. Labour Analgesia.
21. Pain relief –Acute & Chronic.
22. Critical care practice Including oxygen therapy, respiratory therapy, ventilatory support, haemodynamic monitoring, prevention and management of multi organ failure, and care of patients with brain damage or brain dead patients for organ Transplant.
23. Advanced Trauma Life Support (ATLS)
24. Occupational Hazards
25. Safety in Anaesthesia
26. Complications of Anaesthetic procedures, its prevention, detection and management.
27. Record keeping in Anaesthesia
28. Medical Audit
29. Quality Assurance
30. Anaesthesia standards: e.g., Minimum monitoring standard
31. Medicolegal aspects in Anaesthesia
32. Ethics in Anaesthesia
33. Principles of Evidence Based Medicine
34. Basic Research Methodology and Clinical Trials
35. Bio-statistics
36. Computers: Utility, computer assisted learning and data storage, Computerised anaesthesia records.
37. Skills: For planning of Operation Theater, pain clinic, recovery room, intensive care etc. including selection and purchase of equipments.

Taining Programme-

A. Administration Of Anaesthesia & Perioperative Patient Care.

I Year Residents:

Assisting during minor & major anaesthesia procedures and managing patients in recovery or intensive care areas (all Under Supervision).The first month of the first year will be spent in orientation in the operating rooms and attending lectures covering the basics of the discipline. After that the first year of training will be spent in learning the fundamentals of anesthesiology with emphasis on checking of anaesthesia equipment including anaesthesia machine, airway equipment and appropriate monitors, preparation of appropriate dosages of various drugs required at specific point of time, mastering clinical skills regarding selection and implementation of an appropriate anesthesia plan,

placement of lines, induction of anaesthesia, intubation, maintenance of anaesthesia, and the successful reversal of anesthetic agents. Emphasis will also be placed on learning regional anaesthesia and Cardiopulmonary resuscitation. Also the candidates will be assigned guides for thesis so as to help them prepare protocols. To start with the first year residents will observe and then slowly become independent in giving general anaesthesia and Regional anaesthesia to patients belonging to ASA grade I & II for minor and major surgery, under graded supervision. They will be posted in rotation to the following specialties during the first year: Preoperative assessment area, General Surgery, Gynecology, Obstetrics, Orthopedic, ENT, and Recovery Room. They will be assigned to cases in the Operating Room at the hospitals attached to medical teaching institutes affiliated to the University under which they have registered and will gain experience under the direction and supervision of respective academic faculty.

II Year Residents:

Assisting during minor & major procedures under anaesthesia, managing patients in recovery or intensive care areas and Independently conducting minor procedures under anaesthesia (GA/RA) for ASA grade I or II patients (excluding expected difficult airway cases and cases with expected major body fluid shift). The second year of training will be devoted to the subspecialties/superspecialities of anesthesia at the hospitals affiliated to medical teaching institute and the university under the supervision of a faculty member with an aim to concentrate on mastering the knowledge and technical skills associated with providing anesthesia to subspecialty/superspeciality patients. Residents will be rotated in Pediatric anesthesia, Neuroanesthesia, Cardiovascular and Thoracic anesthesia, Ambulatory anesthesia, Obstetrics, Dental Surgery, Ophthalmology, Pain Clinic / Pain Management, Peripheral Theatres, Anaesthesia Outside Operating Rooms, Trauma care, Transplant Surgeries etc. They will be taught to give general anaesthesia and regional anaesthesia (Extradural Block - EDB, Spinal Block, and Peripheral Nerve Blocks) to ASA grade I, II, III & IV patients under supervision for superspeciality theaters. They should be able to give GA/RA to other ASA grade II patients & I independently. Rotations in critical care areas e.g., Trauma Ward, Post Anesthesia Care Unit / ICU / Emergency Medical Service will also be part of the second year training curriculum. They should learn pediatric and trauma life support and maintain skills for basic and advanced cardiac life support. The student should be able to analyze and present scientific data and write a thesis.

III Year Residents:

Assisting during minor & major procedures under anaesthesia, managing patients inrecovery or intensive care areas and Independently conducting both minor and major procedures under anaesthesia (GA/RA) for ASA grade I or II patients (excluding expected difficult airway cases and cases with expected major body fluid shift).The third (final) year of training will be devoted to management of most complex cases available at the institute under the supervision of a faculty member. The residents will be trained to exercise independent judgment, to take responsibility while caring for such patients, and to take part in research projects under the supervision of a faculty member. The student should be

able to plan and administer anaesthesia to all patients under graded supervision including patients for Cardiac, Neurosurgery, and Pediatric surgery and for all major surgery of subspeciality branches. The aim at the end is to be competent and independent soon after the third year of residency in providing anaesthesia to elective and emergency cases belonging to all specialities. The resident should be able to manage critically ill patients and treat intractable pain. They should also know how to organize mass casualty.

Inter-Departmental Rotational Postings

<u>Postings</u>	<u>Period</u>
ICU	3months
Pain and PAC clinic	3months
Emergency room	4weeks
Recovery Room	3months
Radiology	2weeks
ECT-Room	4weeks
Trauma center	4weeks

B. Thesis -

- The aim of thesis should be to make the student able to demonstrate capability in research by planning and conducting systematic scientific inquiry & data analysis and deriving conclusion.
- Thesis protocol should be submitted at the end of three months after admission in the course to the Research Committee of the Institute. The protocol must be presented in the department of Anaesthesiology before being forwarded. The research committee appointed by the Dean/Principal to scrutinize in references to its feasibility, statistical validity, ethical aspects, etc would approve the Protocol.

Protocol in essence should consist of:

- a. Introduction and objectives of the research project.
- b. Brief review of literature.
- c. Suggested materials and methods, and (scheme of work)
- d. Statistician should be consulted at the time of selection of groups, number of cases and method of study. He should also be consulted during the Study.
- e. Bibliography.

Chief guide for thesis will be from the department of Anaesthesiology and co guide(s), if needed, will be from the department of Anaesthesiology or from other disciplines related to the thesis.

The thesis shall relate to the candidate's own work on a specific research problem or a series of clinical case studies in accordance with the approved plan.

The thesis shall be written in English, printed or typed on white A4 size bond paper bearing the matter on one side of paper only and bound with cloth/rexine, with the title, author's name and the name of the College printed on the front cover.

The thesis shall contain: Introduction, review of literature, material and methods, observations, discussions, conclusion and summary and reference as per index medicus.

Each candidate shall submit to the Dean four copies of thesis, through their respective Heads of the Departments, not later than four months prior to the date of commencement of theory examination in the subject.

Academic Activities –

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

ASSESSMENT:-

General Principles

- The assessment should be valid, objective, and reliable.
- It must cover cognitive, psychomotor and affective domains.
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- ix. Didactic lectures attended..... 1 to 10
- x. Thesis progress and evaluation details..... 1 to 10

MD Examination:

Pattern of question for theory Papers- There shall be four theory papers. One paper out of these shall be on ‘Basic Medical Sciences’ and one paper on ‘Recent Advances’ in the discipline. There shall be 100 marks for each paper to be answered in 3 hours’ time. There shall be ‘1 structured essay type question’ for 20 marks besides 8‘short essay type questions’ for 10 marks each in each paper.

Days of practical examination-Practical Examination should be conducted for a batch of upto 8 candidates over a minimum period of two to three days extendable up to 7days subject to the subject curriculum with due approval of the board of

examiners. For a batch of more than 8 the examination may extend accordingly. The theory papers shall be evaluated at the examination center itself before commencement of the practical/clinical and oral examination in the subject during these practical examination days.

Components of examination-It consist of a written examination, a practical examination to assess the clinical/practical competencies and skills, and a viva voce examination.

The examinations shall consist of

- A) theory
- B) practical including clinical
- C) oral

A.Theory-

The 4 papers in theory shall be conducted well in advance before the oral ,clinical/practical examination.

B. Practical

Clinical/Practical examination is the most important part of the evaluation and is aimed at assessing the clinical skills of the candidate and diagnostic reasoning. Entirely objective evaluation of these skills is neither feasible nor desirable. However, in order to test the various skills, the examiners may evaluate the candidates on a structured format, namely, history taking, physical examination, diagnostic reasoning, choice of diagnostic investigations, general management strategies, and general attitude and demeanor towards the patient and the examiners. Patient material selected for examination is should be usually sufficiently representative of the type of patients for whom an internist may be called upon to give an opinion.

C. Pedagogic Skill

The candidate shall be allotted a topic from the discipline at a short notice of few hours, (preferably on the first day of the examination) to prepare and present before the board of examiners within a time span of 15 minutes (preferably on the second day of the examinations) . The teaching skill will be evaluated under various points(as illustrated below) and marks given accordingly.

- (i) Choice of article/topic (unless specifically allotted)
- (ii) Completeness of presentation
- (iii) Clarity of presentation

- (iv) Understanding of the subject and ability to convey the same
- (v) Whether relevant references have been consulted
- (vi) Ability to convey points in favour and against the subject under discussion
- (vii) Use of audio-visual aids
- (viii) Ability to answer questions
- (ix) Time scheduling
- (x) Overall performance

D. Viva-Voce

a. Viva-voce is expected to be conducted at every stage of the practical examination. The resident will be required to answer oral questions on any aspect of the specialty. Oral examination is designed to test the general scientific background of the candidate and his/her own particular contribution embodied by the thesis. A formal "grand viva-voce" may be held at the end of the practical examination. Questions on the thesis/dissertation may be asked at this time as well. The board of examiners will conduct the examination. They will read out the comments & questions and will seek the answers from the candidate. The viva voce should be assessed under the following headings:

1. Thesis viva voce
2. Grand viva voce

All examiners shall be jointly responsible for all parts of the examination. In presence of the external examiners, the Chairman of the conducting board shall make the necessary arrangements for conducting the oral and practical including clinical examination at the department in the college centre .

b. The candidate shall bring the logbook and a copy of his/her thesis mandatorily while appearing for the oral, practical and clinical examination.

Marks for examinations: The examinations shall be organized on the basis of marking system to evaluate and certify candidate's level of knowledge, skill and competence as per distributions mentioned below. In total the overall assessment for a postgraduate shall be for 1000 marks distributed as follows.

A. Internal assessment exam(200 marks)

- Theory 15x5=75
- Practical (Oral, clinical and practical) 15x5=75
- Log book evaluation 10x5=50
- Total : 40x5=200

B. Final MD/MS exam (800 marks)

• Theory (100 x 4 Papers)		400
• Oral ,Clinical/Practical		400
I)Clinical/Practical		(300 marks)
Long exercise (one)		80 marks
Short exercise (three)		120 marks
OSPE(ten)		40 marks
Spots(ten)		40 marks
Pedagogic skill		20 marks
II) Viva		(100 marks)
Thesis Viva		20 marks
Grand Viva		80 marks
Grand Total	(A+B)=	1000 marks

PASS/FAIL- In order to pass the examination in each subject a candidate must secure not less than 50% marks in each head of passing which shall include (1) Theory (2) Practical including clinical and viva voce examination (3) internal assessment examination.

Pattern of Questions:- The PG examination shall be carried out in three parts:-

Theory :-

- There shall be 4 papers with 100 marks for 3hours duration of examination each.
- There shall be 2 structured essay type questions for 15 marks each along with 7 short answer type questions for 10 marks each in each paper.
- The chapter distribution for the papers shall be as follows.

Final Assessment (By University)-

A. Thesis

The thesis shall be referred by the University for evaluation to the Examiners appointed by the University.

The examiners will report independently to the Controller of Examinations and recommend whether the thesis is:

- Approved*
- Returned for improvements as suggested or*
- Rejected*

The thesis shall be deemed to have been accepted when it has been approved by at least two external examiners and if the thesis is rejected by one of the external examiners it shall be referred to another external examiner (other than the one appointed for initial evaluation) whose judgement shall be final for purposes of acceptance or otherwise of the thesis.

Where improvements have been suggested by two or more of the examiners, the candidate shall be required to re-submit the thesis, after making the requisite improvements, for evaluation.

When a thesis is rejected by the examiners, it shall be returned to the candidate who shall have to write it again. The second thesis, as and when submitted shall be treated as a fresh thesis and processed.

Acceptance of thesis submitted by the candidate shall be a pre-condition for his/her admission to the written, oral and practical/clinical part of the examination.

Provided that under special circumstances if the report from one or more examiners is not received by the time, the Post-graduate examination is due, the candidate may be permitted provisionally to sit for the examination but the result be kept with held till the receipt of the report subject to the condition that if the thesis is rejected then the candidate in addition to writing a fresh thesis, shall have to appear in the entire examination again.

A candidate whose thesis stands approved by the examiners but fails in the examination, shall not be required to submit a fresh one if he/she appears in the examination in the same branch on a subsequent occasion.

B. Theory

paper-I : basic science as related to anesthesiology.

paper-II : theory & practice of anesthesia

paper-III : clinical sciences like medicine & surgery related to anesthesia

paper-IV : intensive care medicine, pain medicine and recent advances.

C. Practical

Clinical cases as per University Protocol Viva Voce on equipments, drugs, investigations, laboratory findings etc.

Recommended Reading

I. Text Books

1. Lee's Synopsis of Anaesthesia-
G.B.Cashman, N.J.H Davies, 2006, 13th Butterworth-Heinemann.
2. Wylie & Churchill Davidson's – A practice of Anaesthesia-
Thomas E. Healy Paul R. Knight 2003, 7th, Arnold.
3. Anaesthesia-
Miller Ronald D. 2005, 6th, Elsevier Churchill Livingstone.
4. Yao and Artusio's Anesthesiology-
Fun-Sun F.Yao 2003, 5th, Lippincott Williams & Wilkins.
5. Anesthesia and Coexisting Disease-
R. K. Stoelting S.F. Dierdorf 2002, 4th, Churchill Livingstone.
6. Anesthesia and Uncommon Disease-

- Fleisher 2005, 5th, Saunders Elsevier
7. Clinical Anaesthesiology-
G.E.Morgan M.S.Mikhail 2005, 4th, McGraw-Hill.
 8. Understanding Anaesthesia Equipment-
Jerry A. Dorsch, Susan E. Dorsch 1998, 4th, Williams & Wilkins.
 9. Wards Anaesthesia Equipments-
Davey 2005, 5th, Baillirro Tindall
 10. Anatomy for Anaesthetists-
Harold Ellis Stanley Fieldman 2005, 8th, Blackwell Science.
 11. Pharmac. & Physiology in Anaesthetic Practice -
R. K Stoelting, S.C.Hillier 2006, 4th, Lippincott-Raven.
 12. Shnider and Levinson's Anesthesia for Obstetrics-
Hughes Levinsons Rosen 2002, 4th, Lippincott Williams & Wilkins
 13. Paediatric Anaesthesia-
Gregory 2005, 4th, Churchil Livingstone.
 14. Cardiac Anesthesia
Kaplan 2005, 4th, W. B. Saunders & Co.
 15. Thoracic Anesthesia –
Kaplan 2003, 3rd, Churchil Livingstone.
 16. Clinical Application of Mechanical Ventilation-
David W. Chang 2001, 2nd, Delmar-Thomas Learning.

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

III Journals

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

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SYLLABUS AND CURRICULUM FOR MD - BIOCHEMISTRY -2012-

Preamble

The purpose of this program is to standardize Biochemistry teaching at Post Graduate level through out the country so that it will benefit in achieving uniformity in undergraduate teaching of the subject as well. Accordingly the training in MD-Biochemistry should be distinctive from that in M.sc., Ph.D.(Biochemistry), where the approach to the subject is primarily experimental.

Programme Objectives

A candidate upon successfully qualifying in the M.D. (Biochemistry) Examinations should be able to:

- i) Be a competent Biochemist,
- ii) Work as a teacher in medical faculty both at undergraduate & postgraduate level.
- iii) Supervise modern laboratory techniques & procedures in clinical Biochemistry in the hospital.
- iv) Pursue her/his interest to undergo further specialization.
- v) Carry out & conduct various research problems both at basic and applied level.
- vi) Guide thesis at both Post Graduate and Doctoral level.
- vii) Suggest, evaluate, interpret Biochemical investigation in a given clinical situation and apply knowledge in clinical problems.

Specific Learning Objectives

- i. Understand the concept of Biochemistry regarding Bio-molecules - Carbohydrates, Proteins, Lipids, Nucleic acids, Enzymes, Minerals.
- ii. Have knowledge of intermediary metabolism of the above & regulation of individual metabolism.
- iii. Possess the knowledge of the impairment of metabolism including inborn errors of metabolism.
- iv. Understand the role of nutrition in health & disease.
- v. Apply biochemical knowledge in normal & diseased states.
- vi. Have knowledge regarding the analysis of biological fluids for its chemical constituent & correlating the same in health & disease.

- vii. Develop skills of performing biochemical techniques like Electrophoresis, Colorimetry, Spectrophotometry, Flame photometry, & interpreting the data. Optional- ELISA, RIA, Molecular Biology techniques

Postgraduate Training

Based on the available facilities, department can prepare a list of postgraduate experiments pertaining to basic and applied biochemistry. Active learning should form the mainstay of postgraduate training there should be lectures for postgraduates (at least 20 per year). alongwith seminars, symposia, group-discussions, Journal clubs. The postgraduate students should regularly attend the ward rounds of various clinical departments and learn cases of interest for discussion with the Biochemistry faculty. They should render special investigative services in their respective area of specialization. Each college should have a medical education unit to generate teaching resource material for UG and evolving of problem solving modules.

Assessment-

PATTERN AND SCHEDULE OF INTERNAL ASSESSMENT & FINAL EXAMINATION:-

General Principles

- The assessment should be valid, objective, and reliable.
- It must cover cognitive, psychomotor and affective domains.
- Formative, continuing and summative (final) assessment should be conducted in theory as well as practicals/clinicals. In addition, thesis should be assessed separately.

Overall Weightage

Internal assessment - 20%

Final summative examination - 80%

Formative assessment

The formative assessment should be continuous as well as end-of-term. The former should be based on the feedback from the senior residents and the unit faculty concerned. End-of-term assessment should be held at the end of each semester (upto the 5th semester). Formative assessment will not count towards pass/fail at the end of the program, but will provide feedback to the candidate. Scheme of internal assessment examination It is held by means of a written test and practical (and or clinical) with viva examination by all consultants of the department as per distribution of marks as follows. In such five six monthly tests a candidate shall be evaluated for 1000 marks in total i.e. 200 marks in each term as follows.

Item	1st term	2nd term	3rd term	4th term	5th term
Theory	75 marks	75 marks	75 marks	75 marks	75 marks
Oral, Practical/clinical	75 marks	75 marks	75 marks	75 marks	75 marks
Log book evaluation	50 marks	50 marks	50 marks	50 marks	50 marks
Total	200 marks	200 marks	200 marks	200 marks	200 marks
Gross total	1000 marks				
Carried forward to Final MD/MS Examination	20 % marks ~ 200 marks				

200 marks shall be carried over a period of five terms as follows.

- Log book evaluation- 10 x 5terms= 50 marks
- Theory exam 15 x 5terms= 75 marks
- Oral ,Practical/Clinical exam 15 x 5terms= 75 marks

Evaluation of the Log book:

Each candidate should be required to maintain a log book in which following details will be entered and evaluated on a scale of 1 to 10. At end of each term of 6months of training for 5such terms the logbook will be evaluated and a score is to be calculated out from a maximum of 100 marks for the 10 items as entered in the logbook.

- i. skills learned independently, under supervision or assisted by him.1 to 10
- ii. Presentations in journal clubs 1 to 10.
- iii. Cases presented in clinical meetings 1 to 10
- iv. Presentation in departmental seminars..... 1 to 10
- v. Intra and interdepartmental training and evaluation details.....1 to 10
- vi. Teaching activities.....1 to 10
- vii. Conferences/workshops/CME attended 1 to 10
- viii. Papers presented/published conferences.....1 to 10
- ix. Didactic lectures attended.....1 to 10
- x. Thesis progress and evaluation details.....1 to 10

MD Examination:

Pattern of question for theory Papers- There shall be four theory papers. One paper out of these shall be on ‘Basic Medical Sciences’ and one paper on ‘Recent Advances’ in the discipline. There shall be 100 marks for each paper to be answered in 3 hours’ time. There shall be ‘1 structured essay type question’ for 20 marks besides 8‘short essay type questions’ for 10 marks each in each paper.

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examiners. For a batch of more than 8 the examination may extend accordingly. The theory papers shall be evaluated at the examination center itself before commencement of the practical/clinical and oral examination in the subject during these practical examination days.

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Pattern of Questions:-

The PG examination shall be carried out in three parts:-

Theory :-

- There shall be 4 papers with 100 marks for 3hours duration of examination each.
- There shall be 2 structured essay type questions for 15 marks each along with7 short answer type questions for 10 marks each in each paper.
- The chapter distribution for the papers shall be as follows.

Plan of MD/MS examination:-

The postgraduate examinations shall be in 3 parts.

1. Thesis, to be submitted by each candidate at least 4 months before the date of commencement of the theory examination.
2. Theory There shall be four theory papers.
paper-I : physical organic aspects of biochemistry,biostatistics,biochemical techniques.
paper-II: cell physiology, molecular biology,human genetics.
paper-III: intermediary metabolism,macro and micro-nutrients,inborn error of metabolism.
paper-IV: clinical biochemistry,human nutrition,endocrinology,immunology.
3. Practical will have 2 components namely- exercises and viva voce
A Practical comprising of 3 exercises
B Viva-voce or the oral session including a component of seminar presentation of at least 15 minutes duration.

COURSE CONTENT

Theory

PAPER I

A. PHYSICAL, ORGANIC ASPECTS OF BIOCHEMISTRY AND BIOCHEMICAL TECHNIQUES

- i. Electrolytes, pH buffer system, colloids, law of mass action, surface tension, osmosis, bioenergetics, diffusion, and molecular weight determination.
- ii. Analytical Biochemistry & Instrumentation, Principles & application of colorimetry, fluorometry, spectrophotometry, radio isotopic techniques, atomic absorption, spectroscopy, osmometry centrifugation, nephelometry and chemiluminiscence.
- iii. Bioseparative techniques: Chromatography- Column, paper, TLC, GLC, HPLC, affinity. Electrophoresis- Paper, Agarose, SDS, PAGE
- iv. Protein conformation, interactions, structure activity relationship.
- v. Only the description of accepted structures is required. Structure, physical & chemical properties of the following are required.
 - a) Ribose, xylose, mannose, galactose, fructose, deoxy sugars, aminosugars, uronic acids, lactose, maltose, sucrose, starch, inulin, glycogen, cellulose, glycoaminoglycans.
 - b) Saturated & unsaturated fatty acids, their derivatives, triacyl glycerol, phospholipids, glycolipids, sterols, lipoproteins .
 - c) Amino acids, peptides, polypeptides, hemoglobin, immunoglob^{bins}, collagen and proteoglycans, levels of organization of proteins with reference to insulin & Hb. Protein conformation, interaction and structure activity relationship.
 - d) Purine, pyrimidine, their derivatives, nucleic acids, nucleotide & polynucleotides.

B. BIO-STATISTICS

- i. Basic principles and concepts of biostatistics as applied to health sciences, like concepts of probabilities, mean, standard deviation, law of chance, binomial expression, Bare Heinberg Law st. test! analysis of variance, coefficient of correlation, evaluation of new diagnostic procedure etc.
- ii. Statistical methods in research, mean, SD, SE, P distribution, regression and correlations.
- iii. Computer based applications.

PAPER- II

A. CELL PHYSIOLOGY

- i. Structure of cell, general and specific features, cytoskeleton, nucleus, nucleolus, mitochondria and plasmic reticulum, ribosomes, golgi complex, lysosomes, plasma membranes, gap junctions, cell division- mitosis and neiosis, cell cycle.
- ii. Ultra centrifugation, cell fractionation and differentiation of cellular and sub-cellular organelles.
- iii. Biomembranes, receptors, membrane bound substance mechanisms of transport across the cell membranes.

B. MOLECULAR BIOLOGY AND HUMAN GENETICS:

- i. DNA & RNA as genetic materials, duplication of RNA and DNA, transcription, messenger, transfer and ribosomes their structure and function regulation and expression of genes, regulation of translation, genetic engineering, molecular biology and viruses, molecular basis of cancer.
- ii. Mechanism of action of cytotoxic drugs and antibiotics.
- iii. Immunogenetics, cytogenetics, genetic counseling, medical ethics.

PAPER III

A. ENZYMES:

- i. General properties, classification and nomenclature, kinetic model, Km value factors influencing enzyme-action, specificity, mechanism of enzyme action, enzyme kinetics, regulation of enzyme action, isolation, isoenzymes,coenzymes, clinical enzymology
- ii. Biological oxidation and reduction, bioenergetics.
- iii. Digestion and absorption of food and other nutrients.
- iv. Detoxication! xenobiotics.
- v. Chemical anatomy of human body.

B. VITAMINS:

- i. Structure, sources, daily requirements, physiological role and deficiency manifestations of vitamins, hypo and hyper vitaminoses and vitamins.
- ii. Mechanisms of action of coenzymes.
- iii. metabolism and role of micro and macronutrients.

C. INTERMEDIARY METABOLISM:

- i) Methods of studying intermediary metabolism.
- ii) Intermediary metabolism of carbohydrates, lipids, proteins and amino acids, nucleic acids in human system.
- iii) Muscular contraction, nerve conduction, coagulation of blood.
- iv) Metabolism in specialized tissues like erythrocytes, lens nervous tissue etc.
- v) Metabolic interrelationships and metabolism in starvation.

D. INBORN ERRORS OF METABOLISM:

Inborn errors of carbohydrates, lipids amino acids, protein nucleic acids, mineral metabolism.

PAPER IV

A.HUMAN NUTRITION:

Principal food components, general nutritional requirements, energy requirements, biological value of proteins, specify dynamic action, balanced diet, diet formulation in health and disease, mixed diet, nutritional supplements, food toxins and additives, parenteral nutrition, disorders of nutrition, obesity, protein and protein energy, malnutrition dietary fibers, under-nutrition, laboratory diagnosis of nutritional disorders, National Nutritional programme

B. CLINICAL BIOCHEMISTRY ALONG WITH INVESTIGATIVE ASPECTS:

1. Diabetes mellitus and secondary degenerative changes associated with diabetes mellitus, glycogenosis, galactosemia reducing substances in urine and aids to laboratory diagnosis of these disorders.
2. Ketosis, atherosclerosis, fatty liver, lipoidoses, hyperlipoproteinemias, hypolipoproteinemias and laboratory diagnosis.
3. Aminoacidurias, uremia, phenyl ketonuria, hemoglobinopathies, immunoglobulinopathies, porphyries laboratory diagnosis.
4. Mal-absorption syndromes and their laboratory diagnosis.
5. Gastric and pancreatic function tests.
7. Acid base balance, fluid and electrolyte balance and related disorders; renal function tests. CSF in health and disease.
8. Hepatobiliary function tests and jaundice.
9. Clinical enzymology.
10. Endocrinal disorders and laboratory diagnosis.
11. Diseases of circulatory system, hemopoietic.
12. Diseases of heart, kidneys- principles of peritoneal and hemodialysis.
13. Diseases of digestive systems and related organs like liver, pancreas etc.
14. Diseases of lungs, musculoskeleton system.
15. Diseases of central nervous system.
16. Hereditary disorders.
17. Immunological disorders.
18. Radioimmunoassays and enzyme immunoassay and their clinical applications.
19. Investigative aspects of all diseases mentioned above in the course content.

C. IMMUNOLOGY

D. ENDOCRINOLOGY:

- i) Classification and general mechanism of action of hormones.
- ii) Biogenesis secretion, control, transport and mode of action of following- hypothalamic peptides, adenohipophyseal and neurohypophyseal hormones, thyroid parathyroid hormones calcitonin pancreatic hormones, adenocortical and medullary hormones, gonadal hormones, gastrointestinal hormones, opioid peptides, exorphins, parahormones.
- iii) Biochemistry of conception, reproduction and contraception.
- iv) Endocrine interrelationship and their involvement in metabolic regulation.
- v) Neuromodulators and their mechanism of action, physiological significance

PRACTICALS

1. Estimation of proteins by Folin's method and Dye binding method.
2. Titration of amino acid - Formal titration & pK values
3. Two-dimensional Paper chromatography for separation of amino acids.
4. Ion exchange chromatography
5. Paper electrophoresis
6. Preparation & estimation of glycogen, cholesterol, casein and hemoglobin from biological samples.
7. Estimation of Blood glucose and Glucose tolerance test
8. Estimation of Cholesterol, Triglycerides, free fatty acids and Phospholipids
9. Estimation of Electrolytes, pH and blood gas analysis.
10. Estimation of Urea, Creatinine, Uric acid, Ammonia including clearance tests
11. Estimation of bilirubin and hepato biliary function tests.
12. Estimation of Ca, Mg, Cu, Ceruloplasmin, Fe, Fe binding capacity.
13. Thyroid function tests and other hormone assays by ELISA/RIA.
14. Urinalysis for normal & abnormal constituents
15. Determination of enzyme activity and study of enzyme kinetics
16. Estimation of LDH, Phosphatases, aminotransferases, GGT, amylase and CK isoenzymes.
17. Separation of LDH/alkaline phosphatase isoenzymes by PAGE.
18. Estimation of vitamins A, E, C.
19. Estimation of ethyl alcohol in blood & urine.
20. Analysis of CSF and any other fluid.
21. Estimation of glycosylated hemoglobin, troponin, myoglobin, microalbumin.
22. Estimation of Lp (a), Apo A, Apo B.

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Syllabus and Curriculum for MD - COMMUNITY MEDICINE 2012

Preamble

The purpose of this programme is to standardize Community Medicine teaching at Post Graduate level through out the country so that it will benefit in achieving uniformity in undergraduate teaching of the subject as most of the Post Graduate students are expected to be involved in teaching as faculty members and also in the various areas and fields of public health.

Programme Objectives

A candidate upon successfully qualifying in the M.D. (Community Medicine) examinations should be competent in the following areas:-

- I. Public Health Management
- II. Epidemiology
- III. Health Team Leadership
- IV. Teaching and Training
- V. Research

Specific Learning Objectives

In the area of (I) **Public Health Management**, he/she should be able to :-

- i. Identify health problems of the community in the context of the socio-cultural Milieu.
- ii. Prioritise health problems.
- iii. Identify threats to the environment.
- iv. Identify groups which require special attention (elderly, adolescents, gender, the poor and other marginalized groups) including those facing occupational hazards.
- v. Set objectives, prepare action plan, implement programmes and monitor, supervise and evaluate them.
- vi. Manage Health Information System and respond appropriately to the information gathered.
- vii. Assess costs and carry out programm budgeting.
- viii. Implement public health laws.
- ix. Initiate, implement and supervise National Health Programmes.
- x. Establish Surveillance System and respond to public health threats efficiently and effectively.
- xi. Anticipate, prepare for and respond to disasters.

- xii. Plan human resources development.
- xiii. Manage logistics and materials effectively.
- xiv. Monitor and assure quality in programme implementation.

In the area of (II) **Epidemiology**, he/she should be able to :-

- i. Conduct epidemiological investigation of communicable, non-communicable and other diseases of public health importance and suggest appropriate solution.
- ii. Use effectively the tools of epidemiology for understanding disease causation and determinants of diseases.

In the area of (III) **Health Team Leadership**, he/she should be able to :-

- i. Interact, communicate, educate effectively persons from diverse backgrounds, ages and preferences to promote healthy behaviour through community participation.
- ii. Explain scientific information to public, decision makers and opinion leaders.
- iii. Nurture team spirit and harmonize activities of various members.
- iv. Facilitate intersectoral coordination.
- v. Promote and establish partnerships

In the area of (IV) **Teaching and Training**, he/she should be able to :-

- i) Assess the learning needs of any given group (students, staff or community).
- ii) Formulate learning objectives.
- iii) Plan curriculum and prepare curriculum materials.
- iv) Select and implement appropriate learning methods.
- v) Evaluate learning experiences.

In the area of (V) **Research**, he/she should be able to :-

- i) Critically evaluate data, identify gaps in knowledge and formulate research questions.
- ii) Design and implement Epidemiological and Health Systems Research studies.
- iii) Analyze data and present findings.
- iv) Effectively communicate findings and Public Health Information.
- v) Apply ethical principles to the collection, maintenance, use and dissemination of data and information.

Post Graduate Training

To achieve the stated objectives, various modalities and methods are recommended :- The proportion of these modalities and methods will vary from Institution to institution due to varying facilities for exposure and number of postgraduate students and recognized teachers. However, modalitywise minimum exposure is suggested below ;-

1. *Orientation* - is suggested along with PGs of other disciplines for a period of one week within three months of admission. During orientation course, they should be exposed to the concepts of human behaviour, research methodology including ethics, statistics, Health Management including economics, health policies etc.
2. PG activities should be held at least thrice a week.
3. Class room and field learning-
 - a) *Self directed*: At least twice a week in which the student will present articles, abstracts from journals, seminars, group work, epidemiological and statistical exercises, case studies, family presentation by rotation.
 - b) *Lectures*: The recognized teachers should take lectures. The frequency of lectures should be once a month. The frequency can be increased upto one a week depending on number of teachers.
 - c) Participation in scientific activities, Participation in Panel, Symposia, details, workshops, conferences.
4. Field posting and work

Immunization/ARV clinic	12months
Pediatrics	4weeks
OG	2weeks
PP Center	2weeks
UHC	1year
RHTC	4weeks
Medical Record Section	4weeks

 - a) Posting at subcentres/ PHC/CHC/Urban Health Centres; Total period of one year.
 - b) Posting in the hospital for exposure to clinical departments namely Pediatrics, Gynae & Obstetrics etc. for one month.
 - c) Wherever possible work attachment at District Health Office and Directorate of Health Services - One month
 - d) Short duration posting in various camps, melas, public health emergencies, Investigation of epidemics, implementation of National Health Programmes e.g. Pulse Polio, Leprosy etc.
 - e) Visits to various institution of Public Health Importances.
5. *Teaching exposure*: They should conduct group teaching of undergraduate students. Each student must take 30 classes. They should participate in the training programme conducted by department and should conduct few sessions. They should use the techniques of pedagogy.
6. *Research*
 - a) Thesis; The protocol must be submitted within 6 months and completed thesis should be submitted one year before the University examination.
 - b) They should be involved in departmental research projects.
 - c) They should publish at least one paper in scientific journal.

They should be exposed to computer application, internet, website, Media statistical softwares etc.

Assessment:-

PATTERN AND SCHEDULE OF INTERNAL ASSESSMENT & FINAL EXAMINATION:-

General Principles

- The assessment should be valid, objective, and reliable.
- It must cover cognitive, psychomotor and affective domains.
- Formative, continuing and summative (final) assessment should be conducted in theory as well as practicals/clinicals. In addition, thesis should be assessed separately.

Overall Weightage

Internal assessment - 20%

Final summative examination - 80%

Formative assessment

The formative assessment should be continuous as well as end-of-term. The former should be based on the feedback from the senior residents and the unit faculty concerned. End-of-term assessment should be held at the end of each semester (upto the 5th semester). Formative assessment will not count towards pass/fail at the end of the program, but will provide feedback to the candidate. Scheme of internal assessment examination It is held by means of a written test and practical (and or clinical) with viva examination by all consultants of the department as per distribution of marks as follows. In such five six monthly tests a candidate shall be evaluated for 1000 marks in total i.e. 200 marks in each term as follows.

Item	1st term	2nd term	3rd term	4th term	5th term
Theory	75 marks	75 marks	75 marks	75 marks	75 marks
Oral, Practical/clinical	75 marks	75 marks	75 marks	75 marks	75 marks
Log book evaluation	50 marks	50 marks	50 marks	50 marks	50 marks
Total	200 marks	200 marks	200 marks	200 marks	200 marks
Gross total	1000 marks				
Carried forward to Final MD/MS Examination	20 % marks ~ 200 marks				

200 marks shall be carried over a period of five terms as follows.

- Log book evaluation- 10 x 5terms= 50 marks
- Theory exam 15 x 5terms= 75 marks
- Oral ,Practical/Clinical exam 15 x 5terms= 75 marks

Evaluation of the Log book:

Each candidate should be required to maintain a log book in which following details will be entered and evaluated on a scale of 1 to 10. At end of each term of 6months

of training for 5 such terms the logbook will be evaluated and a score is to be calculated out from a maximum of 100 marks for the 10 items as entered in the logbook.

- i. skills learned independently, under supervision or assisted by him. 1 to 10
- ii. Presentations in journal clubs 1 to 10.
- iii. Cases presented in clinical meetings 1 to 10
- iv. Presentation in departmental seminars..... 1 to 10
- v. Intra and interdepartmental training and evaluation details.....1 to 10
- vi. Teaching activities.....1 to 10
- vii. Conferences/workshops/CME attended 1 to 10
- viii. Papers presented/published conferences.....1 to 10
- ix. Didactic lectures attended.....1 to 10
- x. Thesis progress and evaluation details.....1 to 10

MD Examination:

Pattern of question for theory Papers- There shall be four theory papers. One paper out of these shall be on 'Basic Medical Sciences' and one paper on 'Recent Advances' in the discipline. There shall be 100 marks for each paper to be answered in 3 hours' time. There shall be '1 structured essay type question' for 20 marks besides 8 'short essay type questions' for 10 marks each in each paper.

Days of practical examination-Practical Examination should be conducted for a batch of upto 8 candidates over a minimum period of two to three days extendable up to 7 days subject to the subject curriculum with due approval of the board of examiners. For a batch of more than 8 the examination may extend accordingly. The theory papers shall be evaluated at the examination center itself before commencement of the practical/clinical and oral examination in the subject during these practical examination days.

Components of examination-It consist of a written examination, a practical examination to assess the clinical/practical competencies and skills, and a viva voce examination.

The examinations shall consist of

- A) theory
- B) practical including clinical
- C) oral

A.Theory-

The 4 papers in theory shall be conducted well in advance before the oral , clinical/practical examination.

B. Practical

Clinical/Practical examination is the most important part of the evaluation and is aimed at assessing the clinical/practical skills of the candidate and diagnostic reasoning. Entirely objective evaluation of these skills is neither feasible nor desirable. However, in order to test the various skills, the examiners may evaluate the candidates on a structured format.

C. Pedagogic Skill

The candidate shall be allotted a topic from the discipline at a short notice of few hours, (preferably on the first day of the examination) to prepare and present before the board of examiners within a time span of 15 minutes (preferably on the second day of the examinations) . The teaching skill will be evaluated under various points(as illustrated below) and marks given accordingly.

- (i) Choice of article/topic (unless specifically allotted)
- (ii) Completeness of presentation
- (iii) Clarity of presentation
- (iv) Understanding of the subject and ability to convey the same
- (v) Whether relevant references have been consulted
- (vi) Ability to convey points in favour and against the subject under discussion
- (vii) Use of audio-visual aids
- (viii) Ability to answer questions
- (ix) Time scheduling
- (x) Overall performance

D. Viva-Voce

a.Viva-voce is expected to be conducted at every stage of the practical examination. The resident will be required to answer oral questions on any aspect of the specialty. Oral examination is designed to test the general scientific background of the candidate and his/her

own particular contribution embodied by the thesis. A formal "grand viva-voce" may be held at the end of the practical examination. Questions on the thesis/dissertation may be asked at this time as well. The board of examiners will conduct the examination. They will read out the comments & questions and will seek the answers from the candidate. The viva voce should be assessed under the following headings:

1. Thesis viva voce
2. Grand viva voce

All examiners shall be jointly responsible for all parts of the examination. In presence of the external examiners, the Chairman of the conducting board shall make the necessary arrangements for conducting the oral and practical including clinical examination at the department in the college centre .

b. The candidate shall bring the logbook and a copy of his/her thesis mandatorily while appearing for the oral, practical and clinical examination.

Marks for examinations: The examinations shall be organized on the basis of marking system to evaluate and certify candidate's level of knowledge, skill and competence as per distributions mentioned below. In total the overall assessment for a postgraduate shall be for 1000 marks distributed as follows.

A. Internal assessment exam (200 marks)

- Theory 15x5=75
- Practical (Oral, clinical and practical) 15x5=75
- Log book evaluation 10x5=50
- Total : 40x5=200

B. Final MD/MS exam (800 marks)

- Theory (100 x 4 Papers) 400
- Oral ,Clinical/Practical 400
- I) Clinical/Practical (300 marks)
 - Long exercise (one) 80 marks
 - Short exercise (three) 120 marks
 - OSPE(ten) 40 marks
 - Spots(ten) 40 marks
 - Pedagogic skill 20 marks
- II) Viva (100 marks)
 - Thesis Viva 20 marks
 - Grand Viva 80 marks

Grand Total (A+B)= 1000 marks

PASS/FAIL- In order to pass the examination in each subject a candidate must secure not less than 50% marks in each head of passing which shall include (1) Theory (2) Practical including clinical and viva voce examination (3) internal assessment examination.

Plan of MD/MS Examination:-

Pattern of Questions;-

The Post Graduate examination shall be in three parts :-

1. Thesis, to be submitted by each candidate at least 6 months before the date of commencement of the theory examination.

2.Theory :-

- There shall be 4 papers with 100 marks for 3hours duration of examination each.
- There shall be 2 structured essay type questions for 15 marks each along with 7 short answer type questions for 10 marks each in each paper.

- The chapter distribution for the papers shall be as follows.

3. Practicals

Should be spread over two days.

- i. Generic Units of Evaluation
- ii. Determining the Health needs of a family
- iii. Family Health Exercise
- iv. 2 short cases
- v. Statistical cum epidemiological exercise
- vi. Spots.
- vii. Microbiological/Public Health Laboratory practical
- viii. Viva- Voca

Course Content

Paper I

1. History of Public Health and Evolution of Community Medicine.

2. Concepts in Community Medicine: Concept of Health & Disease, Positive Health, Health Spectrum, Theories related to Disease Causation, Determinants of Health, Health indicators, Methods of Assessment of Health of Individual and Community, Difficulties in measurements, Health Status of various groups and areas, Natural History of Disease, Levels of Prevention, Primary Health Care, Comprehensive Health Care, Immunity & Immunization, Evidence based Medicine etc.

3. Epidemiology

- Definition, aim and uses
- Measurement of disease frequency
- Distribution of disease, time, place and person
- Determinants of Diseases
- Screening
- Measures of association and potential impact
- Casual association
- Epidemiological study designs
- Epidemiological biases and their control
- Surveillance of diseases/disorders/health conditions
- Investigation of outbreaks/epidemics
- Prevention & Control of communicable and non-communicable diseases and other conditions

Paper II

1. Health Management

- National Health related policies and committees
- Programme planning, implementation, monitoring and evaluation
- Strategic projects management
- Organizational behaviour
- Logistic management
- Medical audit
- Introduction to human resource management
- Social Marketing
- Quality management, continuous quality improvement
- Operations Research
- Introduction to Public Health Laws
- Introduction to Health Medical Information System
- Health Systems (organisations, agencies, infrastructure etc.) : International & Within the country
- Communication in organizations, networking and advocacy
- Public Health emergencies
- Health Economics
 - * Introduction to Macro and Micro-economics
 - * Pharmaco-economics
 - * Demand and supply
 - * Health financing
 - * National and District Health Accounts
 - * Insurance (commercial, social security)
 - * User fees

- * Resource mobilization and utilization
 - * Costing and budgeting
 - * Financial sustainability
 - International Health
2. Health Services for Special Groups
- A. Reproductive and Child Health, Family Planning and Population Medicine: Problems and strategies related to various services, initiatives, policies, legislations and programmes for ANC, INC, PNC, Under 5 children population control, Women Empowerment, Gender related issues and Recent Advances.
 - B. School Health
 - C. Adolescent Health
 - D. Older persons: Health Problems, Services and Programmes
 - E. Disadvantaged Groups: Health Problems, Services and Programmes

Paper III

1. **Nutrition:** Definitions, concepts, principles, Food Hygiene, Nutritive values, Nutritional Assessment of individual and Community, Nutritional Problems, Strategies, Initiatives, Nutritional Policy and programmes at various levels, Diet for various groups, Food Adulteration and Legislation to control, Recent Advances in Nutrition.
2. Environmental Health
 - Principles of environmental health and human ecology
 - Environmental health risk assessment
 - Environmental health impact assessment
 - Environmental pollution
 - Toxicology related to public health
 - Food sanitation and safety
 - Medical entomology including vector and rodent control
 - Waste disposal
 - Housing sanitation
 - Environmental health policy, programmes, & legislations
 - Current and emerging issues in environmental health (e.g. slum, healthy city, global warming, etc.)
3. **Occupational health and Safety:** Evolution, Definitions, Concepts, Scopes, Work related Diseases, Initiatives, policies, strategies, programmes and legislations related to safety, welfare and work, Ergonomics, Organization and Administration of medical care in a work environment including industries in unorganized and organized sectors, Injuries types, impact on health, prevention and control and Recent Advances.

4. Population Science & Genetics

- Factors affecting the size of the population
- Measures of fertility and mortality
- Population projection
- Demographic transition
- Implication of rapid population growth
- Life table
- Urbanization
- Genetics: Definitions, Concepts, Problems, Genetic Counselling Management.

5. Biostatistics

- Probability theory
- Level of Measurement
- Central Tendency and dispersion
- Sampling methods
- Sampling errors and confidence intervals
- Test of significance
- Sample size calculation
- Adjustments for confounding
- Introduction to multivariate analysis
- Correlation and regression
- Interaction

Paper IV

1. **Mental Health:** Definitions, Concepts, Problems, Prevention and Control of Mental Disorders including programmes and legislations
2. **Medical Sociology and Behavioural Sciences:** Definitions, Concepts, Social and Behavioural Problems, Cultural, Socio-economic and Psychological Determinants and impacts on health problems, Methods of Assessment, Strategies, Policies for prevention and control, Community Participation, Utilization of Health Services, Knowledge, Attitude, Behaviour and Practices related to various public health problems, Clinico-social evaluation of individuals, Public Relation, Doctor-Patient relationship and hospital sociology, Urbanization and health impacts, Medical anthropology, Accelerated changes in life style. .
3. Information, **Education and Communication:** Definitions, Concepts, Principles, Methods, Planning, Organization and Evaluation, Internet application in Community Medicine.

4. Research Methods

- Literature search
- Choosing research topics
- Formulating research questions
- Study designs - Quantitative & Qualitative
- Measuring reliability and validity
- Sampling
- Instrument development
- Data collection and management
- Data analysis and report
- Communicating research findings
- Scientific writing
- Development of research proposal
- Ethical issues

5. **Pedagogy:** Learning objectives, Learning methods, techniques, processes, evaluations.

6. **Health Technology** – Computer application, software for research and statistical analysis, Awareness regarding remote sensing, GIS and other new technologies

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Syllabus and Curriculum for MD - DERMATOLOGY 2012

ASSESSMENT :-

General Principles

- The assessment should be valid, objective, and reliable.
- It must cover cognitive, psychomotor and affective domains.
- Formative, continuing and summative (final) assessment should be conducted in theory as well as practicals/clinicals. In addition, thesis should be assessed separately.

Overall Weightage

Internal assessment - 20%

Final summative examination - 80%

Formative assessment

The formative assessment should be continuous as well as end-of-term. The former should be based on the feedback from the senior residents and the unit faculty concerned. End-of-term assessment should be held at the end of each semester (upto the 5th semester). Formative assessment will not count towards pass/fail at the end of the program, but will provide feedback to the candidate. Scheme of internal assessment examination It is held by means of a written test and practical (and or clinical) with viva examination by all consultants of the department as per distribution of marks as follows. In such five six monthly tests a candidate shall be evaluated for 1000 marks in total i.e. 200 marks in each term as follows.

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Total	200 marks	200 marks	200 marks	200 marks	200 marks
Gross total	1000 marks				
Carried forward to Final MD/MS Examination	20 % marks ~ 200 marks				

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- v. Intra and interdepartmental training and evaluation details.....1 to 10
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- vii. Conferences/workshops/CME attended 1 to 10
- viii. Papers presented/published conferences.....1 to 10
- ix. Didactic lectures attended.....1 to 10
- x. Thesis progress and evaluation details.....1 to 10

MD Examination:

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Components of examination-It consist of a written examination, a practical examination to assess the clinical/practical competencies and skills, and a viva voce examination.

The examinations shall consist of A) theory

B) practical including clinical

C) oral

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The 4 papers in theory shall be conducted well in advance before the oral , clinical/practical examination.

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- (x) Overall performance

D. Viva-Voce

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- Total : 40x5=200

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- Theory (100 x 4 Papers) 400
 - Oral ,Clinical/Practical 400
- I) Clinical/Practical (300 marks)
- Long exercise (one) 80 marks
 - Short exercise (three) 120 marks
 - OSPE(ten) 40 marks
 - Spots(ten) 40 marks
 - Pedagogic skill 20 marks
- II) Viva (100 marks)

Thesis Viva		20 marks
Grand Viva		80 marks
Grand Total	(A+B)=	1000 marks

PASS/FAIL- In order to pass the examination in each subject a candidate must secure not less than 50% marks in each head of passing which shall include (1) Theory (2) Practical including clinical and viva voce examination (3) internal assessment examination.

Pattern of Questions;-

The PG examination shall be carried out in three parts:-

1. Theory :-

- There shall be 4 papers with 100 marks for 3hours duration of examination each.
- There shall be 2 structured essay type questions for 15 marks each along with short answer type questions for 10 marks each in each paper.
- The chapter distribution for the papers shall be as follows.

Title of the paper

- paper-I : basic science related to dermatology.
- paper-II : principles of dermatology,diagnostics,therapeutics.
- paper-III : venerology ,leprosy.
- paper-IV : clinical dermatology,recent advances.

2.Practical and clinical examination

External examiners – 2 – Dermatologists as per the institute guidelines

Internal examiners – 2 – Dermatologist as per the institute guidelines

1. Practical and/or clinical examination will be held on 1-2 days

Semi-Long case 4

Dermatology – 2

Venereology – 1

Leprology – 1

Spots:10-12 Spot same for each candidate

2. Viva voce examination for General dermatology, Venereology and Leprology

DETAILED SYLLABUS

Fundamentals

- History taking and examination of dermatological patient
- Type of skin lesions
- Distribution patterns
- Aids in diagnosis of skin diseases etc.

Structure and development skin

Biochemistry and Physiology of epidermis and its appendages including

- Melanin synthesis
- Keratinization
- Pathophysiologic reactions of skin
- Basic immunology

Skin Diseases

1. Disorders of Keratinization and epidermal proliferation
 2. Disorders effecting skin appendages, hair, nail, sebaceous glands, sweat glands and apocrine glands etc
 3. Neoplastic disorders of skin
 4. Gendodermatosis
 5. Vesiculo bullous diseases, e.g. pemphigus, pemphigoid, erythema multiforme, dermatitis herpetiformis etc.
 6. Dermatitis
 7. Disorders of pigmentation
 8. Disorders of collagen and connective tissue
 9. Disorders of hair, nail sweat glands, sebaceous glands, apocrine glands, mastocytosis etc.
 10. Disorders of mucous membranes
 11. Disorders involving genitalia
 12. Disorders due to physical agents, heat, cold, light, radiation etc.
 13. Disorders due to chemical agents – reactions to chemicals, occupational dermatosis
 14. Pyodermas
 15. Fungal infections-superficial and deep
 16. Viral infection
 17. Parsitic infestations, insect bites etc.
- Dermatology in relation to internal medicine
Dermatological disorders seen in systemic diseases i.e. Diabetes mellitus, hepatic dysfunction, renal dysfunction and Nutritional deficiency

Metabolic disorders

1. Diabetes mellitus
2. Amino acid metabolism
3. Pophyrin metabolism
4. Lipoidosis
5. Dysproteinemias and agamma glubulinemias etc.
6. Carcinoid syndrome
7. Glycolipid lipoidosis
8. Calcinosis cutis
9. Histiocytosis
10. Hematological systems-reticulosis-leukema etc.
11. Gastro – intestinal system
12. Endocrinal system
13. Neuroctaneous disorder
14. Psychocutaneous disorders

Allergic disorders

1. Anaphlaxis – urticaria / angioedema
2. Serum sickness
3. Reactions drug etc.

Venereal disorders

1. Anatomy of male and female genitalia
2. Syphilis and other trreponematoses, immunology, pathology, diagnosis,

3. Treatment, control etc.
4. Gonococcal uretheritis and complications
5. Lymphogranuloma venereum
6. Chancroid
7. Granuloma inguinale (Donovanosis)
8. Other disorders involving male and female genitalia
9. STIs and control
10. STI and Reproductive health
11. Epidemiology of STI'S,

AIDS

Transmission, prevention, clinical manifestations, prophylaxis of opportunistic infections, Anti-retroviral therapy, treatment in HIV+ve STD cases.

Leprosy

1. Epidemiology
2. Pathogenesis
3. Pathology
4. Diagnosis – clinical features, classifications, laboratory aids
5. Reactive phase – Ocular involvement, Bone involvement
6. Treatment of leprosy and reactions
7. Leprosy control and rehabilitation etc.

Dermatosurgery

1. Basics of dermatosurgery
2. Biopsy techniques
3. Chemical peeling
4. Microdermabrasion
5. Dermatosurgery for acne scar
6. Electrocautery
7. Radiofrequency surgery
8. Cryosurgery
9. LASER
10. Surgery for vitiligo – punch grafting, blister grafting, dermato micro pigmentation

INTER-DEPARTMENTAL ROTATIONAL POSTINGS

Medicine	2weeks
Pediatrics	2weeks
Pathology	2weeks
ART center	2weeks

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Syllabus and Curriculum for MD - FORENSIC MEDICINE 2012

PROGRAMME GOALS

This programme aims at training the PG student to become a competent expert in Forensic Medicine and Medical Toxicology.

PROGRAMME OBJECTIVES

This programme aims at training the PG student to become an expert in Forensic Medicine & Medical Toxicology who at the end of the training will be able to:

1. Identify and define the existing as well as future Medico-legal problems as they emerge in the community and work to resolve such problems by planning, implementing, evaluating and modulating Medico-legal services.
2. Undertake Medico-legal responsibilities and discharge Medico-legal duties, which arise in day-today general practice as well as in hospitals.
3. Keep himself/herself abreast with all recent developments and emerging trends in the field of Medical Ethics and the Law.
4. Evaluate his professional activities, educational needs and select appropriate learning resources periodically.
5. Deal with general principles and practical problems related to forensic, clinical, emergency, environmental, medico-legal and occupational aspects of Toxicology.
6. Impart education in Forensic Medicine and Toxicology to under-graduate and post-graduate students with the help of modern teaching aids.

STUDENT ELIGIBILITY CRITERIA AND SELECTION METHOD

1. Medical Graduates with MBBS or equivalent medical degree from a recognized University in India after the completion of their internship and who are registered with the Indian Medical Council are eligible to apply.
2. Selection of students will be as per the existing regulations of Govt. of Odisha or as may be fixed from time to time.

SPECIFIC OBJECTIVES

At the end of the MD course, a post-graduate student should be able to:

1. Perform Medico-legal autopsy independently with required physical assistance, prepare report and derive inferences.
2. Interpret histo-pathological, microbiological, radiological, chemical analysis, DNA analysis and other investigative reports for Medico-legal purposes.
3. Depose as an expert witness in a Court of Law on Medico-legal matters.
4. Describe relevant legal/court procedures applicable to Medico-legal/medical practice.
5. Identify, examine and prepare reports on Medico-legal cases.

6. Identify and discharge all legal responsibilities in Medico-legal matters.
7. Plan, Organise and supervise Medico-legal work in general/teaching hospitals.
8. Interpret, analyse & review Medico-legal reports prepared by other Medical Officers.
9. Collect, preserve and despatch various trace evidences to the concerned authority.
10. Identify and articulate medical ethics in relation to the patient, profession, society, state and humanity at large.
11. Interpret and advice authorities on matters related to Medical Ethics and the Law.
12. Discharge his duties in respect of forensic, clinical, emergency, environmental, medico-legal and occupational aspects of Toxicology.
13. Plan, Organise and manage Toxicological Laboratory services.
14. Provide information and consultation on all aspects of toxicology to professionals, industry, Government and public at large.

CONCEPTUAL FRAMEWORK

TIMES IN YEARS

3 UNIT 2 FINAL

ORGANISED ASSESSMENT

2½ POSTING FOR

- AUTOPSY WORK SUBMISSION
- CLINICAL FORENSIC MEDICINE & SUBMISSION OF THESIS
- ALL ASPECTS OF TOXICOLOGY

(COLLECTION, PRESERVATION,
TRANSPORTATION, ANALYSIS
OF BIOLOGICAL SAMPLES)

- DNA FINGER-PRINTING
- RESEARCH, ANALYSIS AND

PRESENTATION OF DATA

- MEDICO-LEGAL WORK IN

CASUALTY DEPT

- TOXICOLOGY LAB WORK
- ATTEND COURT SUMMONS

1 UNIT 1 AND

- CLINICAL FORENSIC MEDICINE

- ORIENTATION TO BASIC

MEDICAL SCIENCES.

- AUTOPSY WORK I

- ATTEND COURT SUMMONS N

½ UNIT 0

- INTRODUCTION TO GENERAL CONTINUOUS

PRINCIPLE OF FORENSIC GUIDANCE

MEDICINE & TOXICOLOGY, THESIS

- DEVELOPMENT OF BASIC PROTOCOL

AUTOPSY SKILLS SUBMISSION

- THESIS-TOPIC SELECTION
- DOCUMENTATION
- JOINING FORMALITIES

MODULE UNIT 0 (UPTO 6 MONTHS)

- A. 1. Orientation Programme
 - 2. Basic autopsy skills.
 - 3. General Principles of Forensic Medicine.
 - 4. Introduction to Medical Toxicology.
- B. Organised Teaching Session.
 - 1. Attend and participate in undergraduate classes.
- C. Posting for autopsy work, Clinical Forensic Medicine and Toxicology
- D. Orientation to Organisation and functioning of Toxicology Lab.
- E. Preparation of Thesis protocol.
- F. Introduction to advanced techniques – DNA Fingerprinting.

UNIT 1 (6 – 12 MONTHS)

- A. Clinical Forensic Medicine work for practical experience in Medico legal procedures and on the job practical training in the Medico-legal aspects of emergency medicine, radiology and other clinical disciplines.
- B. Orientation to the applied aspects of Anatomy, Physiology Biochemistry, Microbiology, Pathology, Blood Bank, Psychiatry and Central Forensic Science Laboratory.
- C. Organized teaching session.
 - 1. Undergraduate classes (Attend & participate)
 - 2. Journal review/Review of latest advances - once a fortnight
 - 3. Autopsy case discussion & Gross Autopsy Conference - once a fortnight
 - 4. Clinical forensic medicine case discussion - once a fortnight
 - 5. Seminars - once a week
 - 6. Toxicology conference - once in a month
- D. Thesis Work and other research work.
- E. Posting for Autopsy work, Clinical Forensic Medicine and Toxicology Laboratory.
- F. Attend Court summons for cases conducted by themselves or when deputed where an expert is required to depose by Court of Law.

UNIT 2 (12-36 MONTHS)

- A. Organized teaching session.
 - 1. Attend and participate in undergraduate classes.
 - 2. Journal review - once a fortnight
 - 3. Autopsy case discussion - once a fortnight
 - 4. Clinical forensic medicine case discussion - once a fortnight
 - 5. Seminars - once a fortnight

6. Toxicology conference - once in a month
- B. Submission of Thesis six months prior to examination.
- C. Posting for autopsy work, clinical Forensic Medicine and Toxicology laboratory to continue.
- D. Attend court summons for cases conducted by themselves or when deputed where an expert is required to depose by Court of Law.

SUBJECT CONTENT

I. ORIENTATION PROGRAMME

- A. Familiarisation with the philosophy and guiding principles of MD Forensic Medicine and Toxicology
- B. Identify the programme goals, specific objectives and conceptual framework for his/her course.

II. BASIC AUTOPSY SKILLS

- A. Outline & demonstrate the principles and objectives of postmortem examination, formalities and procedures of medico-legal autopsies in accordance with existing conventions and the law.
- B. Describe and demonstrate the methods of preservation of viscera.

III. General principle of Forensic Medicine and Toxicology

- A. Identify the role of anatomy, physiology, biochemistry, microbiology, pathology, blood bank, psychiatry, radiology, forensic science laboratory and other disciplines of medical science to logically conclude in Medico-legal autopsies and examination of Medico-legal cases.
- B. Describe the basic principles of the techniques used in toxicological laboratory namely TLC, GLC, ASS, HPLC, and Breath Alcohol Analyzer.
- C. Process biological samples for DNA fingerprinting.
- D. Execute the skills and knowledge mentioned in objectives of Forensic Medicine for MBBS

IV. MEDICAL ETHICS & LAW (MEDICAL JURISPRUDENCE)

- A. Describe the history of Forensic Medicine
- B. Describe the Legal and Medico-legal system in India.
- C. Describe medical ethics and the law in relation to medical practice, various declarations, Medical Council of India, disciplinary control, duties of a registered medical practitioner, consent, confidentiality, medical negligence and consumer protection act.
- D. Describe medical ethics and law in relation to organ transplantation, biomedical human research and experimentation, human rights and citizen charter.
- E. Describe the ethics and law in relation to artificial insemination, abortion, antenatal sex, fetus, genetics, and euthanasia.
- F. Interpret the ethics and law applicable to the animal experimentation.
- G. Describe ethics in relation to aged, women and children.
- H. Describe medical ethics and law in relation to nursing and other medical services.

V. CLINICAL FORENSIC MEDICINE

- A. Examine, assess legal implications and prepare report or certificate in cases of physical assault, suspected drunkenness, sexual offences, consummation of marriage and disputed paternity. Collect, preserve & despatch the specimen/material to the concerned authority and interpret the clinical and laboratory findings which are reported.
- B. Examine injured person, prepare Medico-legal report and initiate management.
- C. Determine the age of a person for medico-legal purpose.
- D. Examine a person and assess disability in industrial accidents and diseases.
- E. Perform examination and interpret findings for medico legal purposes in cases pertaining to pregnancy, delivery, artificial insemination, abortion, sterilization, impotence & AIDS.
- F. Describe normal and abnormal sexual behavior and its medico-legal implications.
- G. Examine and assess the medical fitness of a person for insurance, government service, sickness and fitness on recovery from illness.
- H. Examine medico-legal problems related to clinical disciplines of Medicine & allied subjects, Pediatrics, Surgery & allied subjects, ENT, Ophthalmology, Obstetrics & Gynecology, Dermatology and Anesthesiology.

VI. FORENSIC PSYCHIATRY

- A. Explain the common terminologies of Forensic importance in Psychiatry.
- B. Describe the Medico-legal aspects of Psychiatry and mental health.
- C. Describe medico-legal aspects of Drug addiction.
- D. Describe role of Psychiatry in crime investigation, punishment and trial.
- E. Describe the civil and criminal responsibilities of an insane person.

VII. MEDICAL TOXICOLOGY

- A. Describe the law relating to poisons, drugs, cosmetics, narcotic drugs and psychotropic substances.
- B. Examine & diagnose the poisoning cases and apply principles of general management and organ system approach for the management of poisoning cases.
- C. Describe the basic principles of toxic kinetics and toxic dynamics of poisonous substances.
- D. Describe the toxic hazards of occupation, industry, environment and the principles of Predictive Toxicology.
- E. Collect, preserve and despatch the material for analysis, interpret the laboratory findings and perform the Medico-legal formalities in a case of poisoning.
- F. Demonstrate the functioning of TLC, GLC, HPLC, ASS and Spectro-photometer.
- G. Demonstrate the methods of identification and analysis of common poisons prevalent in this region.
- H. Describe the signs, symptoms, diagnosis and management of common acute and Chronic poisoning due to –
 - (a) Corrosives

- (b) Nonmetallic Substances
- (c) Insecticides and Weed Killers
- (d) Metallic Substances
- (e) Vegetable and Organic irritants
- (f) Somniferous Compounds
- (g) Inebriant substances
- (h) Deliriant Substances
- (i) Food contamination/adulteration..
- (j) Substance causing Spinal and cardiac toxicity
- (k) Substances causing Asphyxia (Asphyxiants)
- (l) Household toxins
- (m) Toxic envenomation
- (n) Biological and Chemical warfare.

VIII. FORENSIC PATHOLOGY

- A. Apply the principles involved in methods of identification of human remains by race, age, sex, religion, complexion, stature, hair, teeth, anthropometry, dactylography, foot prints, hairs, tattoos, poroscopy and superimposition techniques.
- B. Perform medico-legal postmortem and be able to exhume, collect, preserve and despatch specimens or trace evidence to the appropriate authority.
- C. Diagnose and describe the pathology of wounds, mechanical and regional injuries, ballistics and wound ballistics, electrical injuries, neglect and starvation, thermal injuries, deaths associated with sexual offences, pregnancy, delivery, abortion, child abuse, dysbarism and barotraumas.
- D. Describe patho-physiology of shock & neurogenic shock.
- E. Describe the patho-physiology of asphyxia, classification, medico legal aspects and postmortem findings of different types of asphyxial deaths.
- F. Diagnose and classify death, identify the signs of death, postmortem changes, interpret the autopsy findings, artefacts and results of the other relevant investigations to logically conclude the cause, manner (suicidal, homicidal and accidental) and time of death.
- G. Manage medico-legal responsibilities in mass disasters involving multiple deaths like fire, traffic accident, aircraft accident., rail accident and natural calamities.
- H. Demonstrate postmortem findings in infant death to differentiate amongst live birth, still birth and dead born.
- I, Perform postmortem examination in cases of death in custody, torture and violation of human rights.
- J. Perform postmortem examination in cases of death due to alleged medical negligence as in Operative and Anaesthetic Deaths.

IX. FUNDAMENTALS OF FORENSIC SCIENCES

- A. Describe the general forensic principle of ballistics, serology, analytical toxicology and photography.
- B. Interpret the scene of crime.
- C. Examine – bloodstains for blood grouping, seminal stains & hair for medico-legal purpose.

X. Basic Sciences and Allied Subjects Posting of PG in these departments?

- A. Anatomy- Anatomy of parts and organs of the body which are important from the medico-legal aspect.
- B. Physiology & Biochemistry- Mechanism of phenomenon that are important in the body from the medico legal viewpoint.
- C. Pathology- Pathophysiology of vital processes and response mechanisms that modulate tissue and organ reaction to all forms of injury and have a bearing on ante mortem and postmortem appearance in Medico legal cases, assessment of the duration of injuries and co-relate trauma and disease.
- D. Dentistry- Adequate knowledge of dentistry for solution of Medico legal problems like age determination.
- E. Radiology- Adequate knowledge of Radiological procedures for solution of medico legal problems.

TEACHING – LEARNING EXPERIENCES

- A. Undergraduate classes
- B. Posting for
 - 1. Autopsy work
 - 2. Clinical Forensic Medicine
 - 3. Clinical toxicology
 - 4. Allied subjects
- C. Journal review
- D. Autopsy Case Discussion
- E. Clinical Forensic Medicine Case Discussion
- F. Seminar on Clinical & Autopsy case problems
- G. Problem solving discussion on cases for expert opinion.

THESIS FOR FORENSIC MEDICINE & TOXICOLOGY

Objectives

- 1. The student should be able to demonstrate capability in research by planning and conducting systematic scientific inquiry & data analysis and deriving conclusion.
- 2. Communicate scientific information for health planning.

Guide for Thesis

- 1. Chief guide should be from the Department of Forensic Medicine & Toxicology.
- 2. Co-guide(s) can be from other disciplines related to the thesis.

Submission of Thesis Protocol

It should be submitted within four months after admission in the course.

1. Protocol in essence should consist of:
 - (a) Introduction and objectives of the research project.
 - (b) Brief review of literature.
 - (c) Suggested materials and methods, and
 - (d) Bibliography
2. The protocol must be presented in the Department of Forensic Medicine & Toxicology before being forwarded to the office of the Dean.
3. Protocol will be approved in accordance with the existing regulations of the AIIMS, New Delhi.

Submission of Thesis

1. Thesis will be submitted six months prior to examination.
2. Thesis in essence should consist of
 - (a) Introduction
 - (b) Review of literature
 - (c) Aims and objectives
 - (d) Material and methods
 - (e) Results
 - (f) Discussion
 - (g) Summary and Conclusions
 - (h) Bibliography

Evaluation of Thesis

Thesis will be evaluated in accordance with the existing regulations of the Sambalpur University.

ASSESSMENT

General Principles

- The assessment should be valid, objective, and reliable.
- It must cover cognitive, psychomotor and affective domains.
- Formative, continuing and summative (final) assessment should be conducted in theory as well as practicals/clinicals. In addition, thesis should be assessed separately.

Overall Weightage

Internal assessment - 20%

Final summative examination - 80%

Formative assessment

The formative assessment should be continuous as well as end-of-term. The former should be based on the feedback from the senior residents and the unit faculty concerned. End-of-term assessment should be held at the end of each semester (upto the 5th semester). Formative assessment will not count towards pass/fail at the end of the program, but will provide feedback to the candidate. Scheme of internal assessment examination It is held by means of a written test and practical (and or clinical) with viva examination by all consultants of the department as per distribution

of marks as follows. In such five six monthly tests a candidate shall be evaluated for 1000 marks in total i.e. 200 marks in each term as follows.

Item	1st term	2nd term	3rd term	4th term	5th term
Theory	75 marks	75 marks	75 marks	75 marks	75 marks
Oral, Practical/clinical	75 marks	75 marks	75 marks	75 marks	75 marks
Log book evaluation	50 marks	50 marks	50 marks	50 marks	50 marks
Total	200 marks	200 marks	200 marks	200 marks	200 marks
Gross total	1000 marks				
Carried forward to Final MD/MS Examination	20 % marks ~ 200 marks				

200 marks shall be carried over a period of five terms as follows.

- Log book evaluation- 10 x 5terms= 50 marks
- Theory exam 15 x 5terms= 75 marks
- Oral ,Practical/Clinical exam 15 x 5terms= 75 marks

Evaluation of the Log book:

Each candidate should be required to maintain a log book in which following details will be entered and evaluated on a scale of 1 to 10. At end of each term of 6months of training for 5such terms the logbook will be evaluated and a score is to be calculated out from a maximum of 100 marks for the 10 items as entered in the logbook.

- i. skills learned independently, under supervision or assisted by him. 1 to 10
- ii. Presentations in journal clubs1 to 10.
- iii. Cases presented in clinical meetings 1 to 10
- iv. Presentation in departmental seminars..... 1 to 10
- v. Intra and interdepartmental training and evaluation details.....1 to 10
- vi. Teaching activities.....1 to 10
- vii. Conferences/workshops/CME attended 1 to 10
- viii. Papers presented/published conferences.....1 to 10
- ix. Didactic lectures attended.....1 to 10
- x. Thesis progress and evaluation details.....1 to 10

MD Examination:

Pattern of question for theory Papers- There shall be four theory papers. One paper out of these shall be on 'Basic Medical Sciences' and one paper on 'Recent Advances' in the discipline. There shall be 100 marks for each paper to be answered in 3 hours' time. There shall be '1 structured essay type question' for 20 marks besides 8'short essay type questions' for 10 marks each in each paper.

Days of practical examination-Practical Examination should be conducted for a batch of upto 8 candidates over a minimum period of two to three days extendable up to 7days subject to the subject curriculum with due approval of the board of examiners. For a batch of more than 8 the examination may extend accordingly. The theory papers shall be evaluated at the examination center itself before commencement of the practical/clinical and oral examination in the subject during these practical examination days.

Components of examination-It consist of a written examination, a practical examination to assess the clinical/practical competencies and skills, and a viva voce examination.

- The examinations shall consist of
- A) theory
 - B) practical including clinical
 - C) oral

A.Theory-

The 4 papers in theory shall be conducted well in advance before the oral , clinical/practical examination.

B. Practical

Clinical/Practical examination is the most important part of the evaluation and is aimed at assessing the clinical/practical skills of the candidate and diagnostic reasoning. Entirely objective evaluation of these skills is neither feasible nor desirable. However, in order to test the various skills, the examiners may evaluate the candidates on a structured format.

C. Pedagogic Skill

The candidate shall be allotted a topic from the discipline at a short notice of few hours, (preferably on the first day of the examination) to prepare and present before the board of examiners within a time span of 15 minutes (preferably on the second day of the examinations) . The teaching skill will be evaluated under various points(as illustrated below) and marks given accordingly.

- (i) Choice of article/topic (unless specifically allotted)
- (ii) Completeness of presentation
- (iii) Clarity of presentation
- (iv) Understanding of the subject and ability to convey the same
- (v) Whether relevant references have been consulted
- (vi) Ability to convey points in favour and against the subject under discussion
- (vii) Use of audio-visual aids
- (viii) Ability to answer questions
- (ix) Time scheduling
- (x) Overall performance

D. Viva-Voce

a.Viva-voce is expected to be conducted at every stage of the practical examination. The resident will be required to answer oral questions on any aspect of the specialty. Oral examination is designed to test the general scientific background of the candidate and his/her own particular contribution embodied by the thesis. A formal "grand viva-voce" may be held at the end of the practical examination. Questions on the thesis/dissertation may be asked at this time as well. The board of examiners will conduct the examination. They will read out the comments & questions and will seek the answers from the candidate. The viva voce should be assessed under the following headings:

1. Thesis viva voce
2. Grand viva voce

All examiners shall be jointly responsible for all parts of the examination. In presence of the external examiners, the Chairman of the conducting board shall make the necessary arrangements for conducting the oral and practical including clinical examination at the department in the college centre .

b. The candidate shall bring the logbook and a copy of his/her thesis mandatorily while appearing for the oral, practical and clinical examination.

Marks for examinations: The examinations shall be organized on the basis of marking system to evaluate and certify candidate's level of knowledge, skill and competence as per distributions mentioned below. In total the overall assessment for a postgraduate shall be for 1000 marks distributed as follows.

A. Internal assessment exam (200 marks)

- | | |
|--|----------|
| • Theory | 15x5=75 |
| • Practical (Oral, clinical and practical) | 15x5=75 |
| • Log book evaluation | 10x5=50 |
| Total : | 40x5=200 |

B. Final MD/MS exam (800 marks)

• Theory (100 x 4 Papers)	400
• Oral, Clinical/Practical	400
I) Clinical/Practical	(300 marks)
Long exercise (one)	80 marks
Short exercise (three)	120 marks
OSPE (ten)	40 marks
Spots (ten)	40 marks
Pedagogic skill	20 marks
II) Viva	(100 marks)
Thesis Viva	20 marks
Grand Viva	80 marks
Grand Total (A+B)=	1000 marks

PASS/FAIL- In order to pass the examination in each subject a candidate must secure not less than 50% marks in each head of passing which shall include (1) Theory (2) Practical including clinical and viva voce examination (3) internal assessment examination.

Pattern of Examination:-

The PG examination shall be carried out in three parts:-

Theory :-

- There shall be 4 papers with 100 marks for 3 hours duration of examination each.
- There shall be 2 structured essay type questions for 15 marks each along with 7 short answer type questions for 10 marks each in each paper.
- The chapter distribution for the papers shall be as follows.

Assessment of candidates on completion of MD course will be carried out in accordance with the existing rules and regulations of the Sambalpur University & MCI Norms. All candidates will be examined and evaluated under the following Heads:

Theory - Will consist of four papers as under:

paper-I : basic science and allied subjects related to forensic medicine.

paper-II : clinical forensic medicine, forensic psychiatry and medical jurisprudence.

paper-III : forensic pathology and toxicology.

paper-IV : applied forensic medicine, ,recent advances.

Practical Examination (Two days)

Day 1

- **Thesis Presentation** - For assessment of research capability.
- **Presentation of a Topic (Seminar)** - To evaluate teaching ability.
- **Clinical Cases** - (Any 4) Age estimation, Injury report, Examination of an insane person to evaluate criminal/civil responsibility, Examination of an intoxicated person, Examination of a suspected case of poisoning (Acute/ Chronic), Disputed paternity case, Sexual offences.
- **Spots** - (10) Histopathology slides, Photographs, ligature material, X-Rays, Soft tissue specimens, Bones, Poisons and Weapons.
- **Toxicology Exercises** - (Any 4) TLC, GLC, HPLC, AAS, Spectrophotometer and Electrophoresis.
- **Spot tests** - For common poisons and identification of stains (Semen, Blood, Saliva)

Day 2

- Postmortem Examination.
- Expert Second Opinion.
- Grand Viva Voce.

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Syllabus and Curriculum for MD - GENERAL MEDICINE 2012

Preamble

A postgraduate specialist having undergone the required training should be able to recognize the health needs of the community, should be competent to handle effectively medical problems and should be aware of the recent advances pertaining to his speciality. The PG student should acquire the basic skills in teaching of medical/para-medical students. He /she is also expected to know the principles of research methodology and modes of consulting library.

Programme Objectives

At the end of postgraduate training the student should be able to :-

- Practice his speciality ethically
- Demonstrate sufficient understanding of basic sciences related to his speciality.
- Diagnose and manage majority of conditions in his speciality (clinically and with the help of relevant investigations)
- Plan and advise measures for the prevention and rehabilitation of patients belonging to his speciality
- Play the assigned role in the implementation of National Health Programs
- Demonstrate competence in basic concepts or research methodology
- Develop good teaching skills

Specific learning objectives

- Theoretical knowledge:** A student should have fair knowledge of basic sciences (Anatomy, Physiology, Biochemistry, Microbiology, Pathology and Pharmacology) as applied to his speciality. He/she should acquire in-depth knowledge of his subject including recent advances. He should be fully conversant with the bedside procedures (diagnostic and therapeutic) and having knowledge of latest diagnostics and therapeutics available.
- Clinical/Practical skills:** A student should be expert in good history taking, physical examination, providing basic life support and advanced cardiac life support, common procedures like FNAC, Biopsy, aspiration from serous cavities, lumbar puncture etc. He/she should be able to choose the required investigations.
- Research:** He/she should know the basic concepts of research methodology, plan a research project and should know how to consult library. Basic knowledge of statistics is also required.

- d) **Teaching:** Should learn the basic methodology of teaching and develop competence in teaching medical/paramedical students.

Postgraduate Training

Didactic lectures are of least importance; seminars, journal clubs, symposia, reviews and guest lectures should get priority for theoretical knowledge. Bedside teaching, grand rounds, interactive group discussions and clinical demonstrations should be the hallmark of clinical/practical learning. Student should have hand-on training in performing various procedures (medical/surgical concerning his subject) and ability to interpret various tests / investigations. Exposure to newer specialized diagnostic / therapeutic procedures concerning his subject should be given.

A Clinical postings

- I. A major tenure of posting should be in internal medicine. It should include care of in-patients, out-patients, special clinics and maintenance of case records for both in- and out-patients.
- II. Exposure to the following areas (which must be an integral constituent of medicine department) must be done:-

1. Medical IeU
2. Medical IeeU and noninvasive cardiac-diagnostics like TMT, echo etc.
3. Dialysis section
4. Endoscopy

- III. Rotation of posting

Inter-unit rotation in the department should be done for a period of up to one year (divided during the first year and third year while candidate stays in the parent unit through out. the duration of his thesis work). Some exposure in psychiatry, dermatology, paediatrics and chest & TB should also be done as follows.

Neurology	4weeks
Nephrology	4weeks
Cardiology	4weeks
Central casualty	4weeks
Pathology	2weeks
Radiology	2weeks
ICU	4weeks
ICCU	4weeks
Dermatology	2weeks
Psychiatry	2weeks
Pulmonary Medicine	4weeks
ART center	4weeks
Endoscopy	4weeks

C. Clinical meetings

There should be an intra- and inter-departmental meetings for discussing the uncommon / interesting medical problems. Each student must be asked to present a specified number of cases for clinical discussion, perform procedures / tests / operations / present seminars / review articles from various journals in inter-unit / interdepartmental teaching sessions. They should be entered in

a Log Book and signed by the authorized teacher and HOD.

Thesis writing: Thesis writing is compulsory Presentation / publication of papers in conferences will be desirable

Teaching: Each PG student will be required to teach undergraduate (clinical demonstration) - at least 20 sessions

Assessment:-

General Principles

- The assessment should be valid, objective, and reliable.
- It must cover cognitive, psychomotor and affective domains.
- Formative, continuing and summative (final) assessment should be conducted in theory as well as practicals/clinicals. In addition, thesis should be assessed separately.

Overall Weightage

Internal assessment - 20%

Final summative examination - 80%

Formative assessment

The formative assessment should be continuous as well as end-of-term. The former should be based on the feedback from the senior residents and the unit faculty concerned. End-of-term assessment should be held at the end of each semester (upto the 5th semester). Formative assessment will not count towards pass/fail at the end of the program, but will provide feedback to the candidate. Scheme of internal assessment examination It is held by means of a written test and practical (and or clinical) with viva examination by all consultants of the department as per distribution of marks as follows. In such five six monthly tests a candidate shall be evaluated for 1000 marks in total i.e. 200 marks in each term as follows.

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Carried forward to FinalMD/MSExamination	20 % marks ~ 200 marks				

200 marks shall be carried over a period of five terms as follows.

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MD Examination:

Pattern of question for theory Papers- There shall be four theory papers. One paper out of these shall be on 'Basic Medical Sciences' and one paper on 'Recent Advances' in the discipline. There shall be 100 marks for each paper to be answered in 3 hours' time. There shall be '1 structured essay type question' for 20 marks besides 8'short essay type questions' for 10 marks each in each paper.

Days of practical examination-Practical Examination should be conducted for a batch of upto 8 candidates over a minimum period of two to three days extendable up to 7days subject to the subject curriculum with due approval of the board of examiners. For a batch of more than 8 the examination may extend accordingly. The theory papers shall be evaluated at the examination center itself before commencement of the practical/clinical and oral examination in the subject during these practical examination days.

Components of examination-It consist of a written examination, a practical examination to assess the clinical/practical competencies and skills, and a viva voce examination.

- The examinations shall consist of
- A) theory
 - B) practical including clinical
 - C) oral

A.Theory-

The 4 papers in theory shall be conducted well in advance before the oral , clinical/practical examination.

B. Practical

Clinical/Practical examination is the most important part of the evaluation and is aimed at assessing the clinical/practical skills of the candidate and diagnostic reasoning. Entirely objective evaluation of these skills is neither feasible nor desirable. However, in order to test the various skills, the examiners may evaluate the candidates on a structured format.

C. Pedagogic Skill

The candidate shall be allotted a topic from the discipline at a short notice of few hours, (preferably on the first day of the examination) to prepare and present before the board of examiners within a time span of 15 minutes (preferably on the second day of the examinations) . The teaching skill will be evaluated under various points(as illustrated below) and marks given accordingly.

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- (v) Whether relevant references have been consulted
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- (vii) Use of audio-visual aids
- (viii) Ability to answer questions
- (ix) Time scheduling
- (x) Overall performance

D. Viva-Voce

a.Viva-voce is expected to be conducted at every stage of the practical examination. The resident will be required to answer oral questions on any aspect of the specialty. Oral examination is designed to test the general scientific background of the candidate and his/her own particular contribution embodied by the thesis. A formal "grand viva-voce" may be held at the end of the practical examination. Questions on the thesis/dissertation may be asked at this time as well. The board of examiners will conduct the examination. They will read out the comments & questions and will seek the answers from the candidate. The viva voce should be assessed under the following headings:

1. Thesis viva voce
2. Grand viva voce

All examiners shall be jointly responsible for all parts of the examination. In presence of the external examiners, the Chairman of the conducting board shall make the necessary arrangements for conducting the oral and practical including clinical examination at the department in the college centre .

b. The candidate shall bring the logbook and a copy of his/her thesis mandatorily while appearing for the oral, practical and clinical examination.

Marks for examinations: The examinations shall be organized on the basis of marking system to evaluate and certify candidate's level of knowledge, skill and competence as per distributions mentioned below. In total the overall assessment for a postgraduate shall be for 1000 marks distributed as follows.

A.Internal assessment exam(200 marks)

- Theory 15x5=75
- Practical (Oral, clinical and practical) 15x5=75
- Log book evaluation 10x5=50
- Total : 40x5=200

B.Final MD/MS exam (800 marks)

- Theory (100 x 4 Papers) 400
- Oral ,Clinical/Practical 400
 - I)Clinical/Practical (300 marks)
 - Long exercise (one) 80 marks
 - Short exercise (three) 120 marks
 - OSPE(ten) 40 marks
 - Spots(ten) 40 marks
 - Pedagogic skill 20 marks
 - II) Viva (100 marks)

Thesis Viva		20 marks
Grand Viva		80 marks
Grand Total	(A+B)=	1000 marks

PASS/FAIL- In order to pass the examination in each subject a candidate must secure not less than 50% marks in each head of passing which shall include (1) Theory (2) Practical including clinical and viva voce examination (3) internal assessment examination.

Plan of MD/MS Examination:-

The PG examination shall be carried out in three parts:-

1. Thesis to be submitted by each candidate at least 4 months before the commencement of theory examination.
2. **Theory :-**
 - There shall be 4 papers with 100 marks for 3hours duration of examination each.
 - There shall be 2 structured essay type questions for 15 marks each along with 7 short answer type questions for 10 marks each in each paper.
 - The chapter distribution for the papers shall be as follows.

Theory: Four papers of 3 hours each.

paper-I : basic sciences.

paper-II : applied pathology and microbiology, pharmacology, therapeutics, social and Environmental medicine..

paper-III : General Medicine

paper-IV : Recent advances in Medicine.

3. Clinical/Practical

3-4 Clinical cases

Interpretation of Data, clinical problems, X-rays, ECGs and OSCE (Clinical Problems)

4. Viva-voce

Due weightage should be given to Log Book Records and day-to-day observation during the training.

Course content (components of curriculum)

No limit can be fixed and no fixed number of topics can be prescribed as course contents. He is expected to know his subject in depth, however, emphasis should be on the diseases / health problems most prevalent in that area. Knowledge of recent advances and basic sciences as applicable to his / her speciality should get high priority. Competence in surgical skills commensurate with the speciality (actual hand on training) must be ensured.

Details of Course Content

Disorders of
Cardiovascular System
Respiratory Diseases
Gastro intestinal disorders
Hepatobiliary Disorder
Endocrinology
Neurology
Nephrology
Metabolic Diseases
Rheumatology
Haematology
Nutritional deficiency diseases
Immunology & Allergy
Infectious diseases
Parasitology
Environmental disorders
Fluid & electrolyte disorders -
Poisoning
Genetic & Molecular diseases
Exergencies
National Health Prorammes
Recent Advances
Other Mise, disorders
Medical Ethics or legal liabilities (CPA)

Principles of Medicine

Practice of Medicine and Therapeutics

Books & Journals suggested for reading

Books

Harrison's Principles & Practice of Medicine
Price's text book of medicine
API text book of medicine
Davidson's principles and Practice of Medicine
Medical emergencies in general practice by S.P. Gupta

Journals

J. Assoc. Phys. India
British medical journal
Postgraduate medical journal
Lancet
Journal of Americal medical association
British Heart Journal (Heart)
Medical clinics of North America

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Syllabus and Curriculum for MS - GENERAL SURGERY 2012

Preamble

A postgraduate specialist having undergone the required training should be able to recognize the health needs of the community, should be competent to handle effectively medical problems and should be aware of the recent advances pertaining to his speciality. The PG student should acquire the basic skills in teaching of medical/para-medical students. He /she is also expected to know the principles of research methodology and modes of consulting library.

Programme Objectives

At the end of postgraduate training the student should be able to: -

- Practice his speciality ethically
- Demonstrate sufficient understanding of basic sciences related to his speciality. Diagnose and manage majority of conditions in his speciality (clinically and with the help of relevant investigations)
- Plan and advise measures for the prevention and rehabilitation of patients belonging to his speciality
- Play the assigned role in the implementation of National Health Programs
- Demonstrate competence in basic concepts or research methodology
- Develop good teaching skills .

Specific learning objectives

- a) Theoretical knowledge: A student should have fair knowledge of basic sciences (Anatomy, Physiology, Biochemistry, Microbiology, Pathology and pharmacology) as applied to his speciality. He/she should acquire in-depth knowledge of his subject including recent advances. He should be fully conversant with the bedside procedures (diagnostic and therapeutic) and having knowledge of latest diagnostics and therapeutics available.
- b) Clinical/Practical skills: A student should be expert in good history taking, physical examination, providing basic life support and advanced cardiac life support, common procedures like FNAC, Biopsy, aspiration from serous cavities, lumbar puncture etc. He/she should be able to choose the required investigations.
- c) Research: He/she should know the basic concepts of research methodology, plan a research project and should know how to consult library. Basic knowledge of statistics is also required.

- d) Teaching: Should learn the basic methodology of teaching and develop competence in teaching medical/paramedical students.

Postgraduate training

Didactic lectures are of least importance; seminars, journal clubs, symposia, reviews and guest lectures should get priority for theoretical knowledge. Bedside teaching, grand rounds, interactive group discussions and clinical demonstrations should be the hallmark of clinical/practical learning. Student should have hand-on training in performing various procedures (medical / surgical concerning his subject) and ability to interpret various tests; investigations. Exposure to newer specialized diagnostic / therapeutic procedures concerning his subject should be given.

Clinical Postings

1. A major tenure of posting should be in General Surgery. It should include care of inpatients, out-patients, special clinics and maintenance of case records for both in and out patients.
2. Exposure to the following areas should be given:-
 1. Surgical ICU - Identify and rectify electrolyte disturbance and acid base imbalance.
 2. Cardiopulmonary resuscitation and endotracheal intubation
 3. Respiratory insufficiency - interpretation of blood gas analysis
 4. First-aid fracture management

If these services are not provided by the Deptt. of General Surgery and these are separate independent deptts, then two weeks posting in each of these areas should be done

- I. Rotation of posting Inter-unit rotation in the department should be done for a period of up to one year (divided during the first year and third year while candidate stays in the parent unit through out the duration of his thesis work).

Clinical meetings

There should be an intra- and inter-departmental meetings for discussing the uncommon / interesting medical problems,

Each student must be asked to present a specified number of cases for clinical discussion, perform procedures / tests / operations / present seminars / review articles from various journals in inter-unit / interdepartmental teaching sessions, They should be entered in a Log Book and signed by the authorized teacher and HOD,

Thesis writing: Thesis writing is compulsory Presentation/publication of papers in conferences will be desirable

Teaching: Each PG student will be required to teach undergraduate (clinical demonstration) - at least 20 sessions

Assessment:-

General Principles

- The assessment should be valid, objective, and reliable.
- It must cover cognitive, psychomotor and affective domains.
- Formative, continuing and summative (final) assessment should be conducted in theory as well as practicals/clinicals. In addition, thesis should be assessed separately.

Overall Weightage

Internal assessment - 20%

Final summative examination - 80%

Formative assessment

The formative assessment should be continuous as well as end-of-term. The former should be based on the feedback from the senior residents and the unit faculty concerned. End-of-term assessment should be held at the end of each semester (upto the 5th semester). Formative assessment will not count towards pass/fail at the end of the program, but will provide feedback to the candidate. Scheme of internal assessment examination It is held by means of a written test and practical (and or clinical) with viva examination by all consultants of the department as per distribution of marks as follows. In such five six monthly tests a candidate shall be evaluated for 1000 marks in total i.e. 200 marks in each term as follows.

Item	1st term	2nd term	3rd term	4th term	5th term
Theory	75 marks	75 marks	75 marks	75 marks	75 marks
Oral, Practical/clinical	75 marks	75 marks	75 marks	75 marks	75 marks
Log book evaluation	50 marks	50 marks	50 marks	50 marks	50 marks
Total	200 marks	200 marks	200 marks	200 marks	200 marks
Gross total	1000 marks				
Carried forward to Final MD/MS Examination	20 % marks ~ 200 marks				

200 marks shall be carried over a period of five terms as follows.

- Log book evaluation- 10 x 5terms= 50 marks
- Theory exam 15 x 5terms= 75 marks
- Oral ,Practical/Clinical exam 15 x 5terms= 75 marks

Evaluation of the Log book:

Each candidate should be required to maintain a log book in which following details will be entered and evaluated on a scale of 1 to 10. At end of each term of 6months of training for 5such terms the logbook will be evaluated and a score is to be calculated out from a maximum of 100 marks for the 10 items as entered in the logbook.

- I. skills learned independently, under supervision or assisted by him.1 to 10
- II. Presentations in journal clubs1 to 10.
- III. Cases presented in clinical meetings 1 to 10
- IV. Presentation in departmental seminars..... 1 to 10
- V. Intra and interdepartmental training and evaluation details.....1 to 10
- VI. Teaching activities.....1 to 10
- VII. Conferences/workshops/CME attended 1 to 10
- VIII. Papers presented/published conferences.....1 to 10
- IX. Didactic lectures attended.....1 to 10
- X. Thesis progress and evaluation details.....1 to 10

MD Examination:

Pattern of question for theory Papers- There shall be four theory papers. One paper out of these shall be on 'Basic Medical Sciences' and one paper on 'Recent Advances' in the discipline. There shall be 100 marks for each paper to be answered in 3 hours' time. There shall be '1 structured essay type question' for 20 marks besides 8'short essay type questions' for 10 marks each in each paper.

Days of practical examination-Practical Examination should be conducted for a batch of upto 8 candidates over a minimum period of two to three days extendable up to 7days subject to the subject curriculum with due approval of the board of examiners. For a batch of more than 8 the examination may extend accordingly. The theory papers shall be evaluated at the examination center itself before commencement of the practical/clinical and oral examination in the subject during these practical examination days.

Components of examination-It consist of a written examination, a practical examination to assess the clinical/practical competencies and skills, and a viva voce examination.

- The examinations shall consist of
- A) theory
 - B) practical including clinical
 - C) oral

A.Theory-

The 4 papers in theory shall be conducted well in advance before the oral , clinical/practical examination.

B. Practical

Clinical/Practical examination is the most important part of the evaluation and is aimed at assessing the clinical/practical skills of the candidate and diagnostic reasoning. Entirely objective evaluation of these skills is neither feasible nor desirable. However, in order to test the various skills, the examiners may evaluate the candidates on a structured format.

C. Pedagogic Skill

The candidate shall be allotted a topic from the discipline at a short notice of few hours, (preferably on the first day of the examination) to prepare and present before the board of examiners within a time span of 15 minutes (preferably on the second day of the examinations) . The teaching skill will be evaluated under various points(as illustrated below) and marks given accordingly.

- (i) Choice of article/topic (unless specifically allotted)
- (ii) Completeness of presentation
- (iii) Clarity of presentation
- (iv) Understanding of the subject and ability to convey the same
- (v) Whether relevant references have been consulted
- (vi) Ability to convey points in favour and against the subject under discussion
- (vii) Use of audio-visual aids
- (viii) Ability to answer questions
- (ix) Time scheduling
- (x) Overall performance

D. Viva-Voce

a.Viva-voce is expected to be conducted at every stage of the practical examination. The resident will be required to answer oral questions on any aspect of the specialty. Oral examination is designed to test the general scientific background of the candidate and his/her own particular contribution embodied by the thesis. A formal "grand viva-voce" may be held at the end of the practical examination. Questions on the thesis/dissertation may be asked at this time as well. The board of examiners will conduct the examination. They will read out the

comments & questions and will seek the answers from the candidate. The viva voce should be assessed under the following headings:

1. Thesis viva voce
2. Grand viva voce

All examiners shall be jointly responsible for all parts of the examination. In presence of the external examiners, the Chairman of the conducting board shall make the necessary arrangements for conducting the oral and practical including clinical examination at the department in the college centre .

b. The candidate shall bring the logbook and a copy of his/her thesis mandatorily while appearing for the oral, practical and clinical examination.

Marks for examinations: The examinations shall be organized on the basis of marking system to evaluate and certify candidate's level of knowledge, skill and competence as per distributions mentioned below. In total the overall assessment for a postgraduate shall be for 1000 marks distributed as follows.

A. Internal assessment exam (200 marks)

- Theory 15x5=75
 - Practical (Oral, clinical and practical) 15x5=75
 - Log book evaluation 10x5=50
- Total : 40x5=200

B. Final MD/MS exam (800 marks)

- Theory (100 x 4 Papers) 400
 - Oral ,Clinical/Practical 400
- I) Clinical/Practical (300 marks)
- Long exercise (one) 80 marks
 - Short exercise (three) 120 marks
 - OSPE (ten) 40 marks
 - Spots (ten) 40 marks
 - Pedagogic skill 20 marks
- II) Viva (100 marks)
- Thesis Viva 20 marks
 - Grand Viva 80 marks

Grand Total (A+B)= 1000 marks

PASS/FAIL- In order to pass the examination in each subject a candidate must secure not less than 50% marks in each head of passing which shall include (1) Theory (2) Practical including clinical and viva voce examination (3) internal assessment examination.

Pattern of Questions;- The PG examination shall be carried out in three parts:-

Theory :-

- There shall be 4 papers with 100 marks for 3hours duration of examination each.
- There shall be 2 structured essay type questions for 15 marks each along with short answer type questions for 10 marks each in each paper.
- The chapter distribution for the papers shall be as follows.

Postgraduate Examination (50% marks for theory and 50% marks for practicat)

Thesis to be submitted by each candidate at least 6 months before the commencement of theory examination:

50 % marks allotted to Theory examination and 50 % for Clinical examination

Theory:

Four papers of 3 hours each.

Paper I Basic Sciences

Paper II Principles and Practice of Surgery

Paper III Principles and practice of Operative Surgery

Paper IV Recent Advances

Clinical/Practical

3-4 Clinical cases

Interpretation of Data, clinical problems, X-rays, instruments and OSeE
(Clinical Problems)

Viva-voce

Due weightage should be given to Log Book Records and day-to-day observation during the training.

Course Contents (Components of curriculum):

No limit can be fixed and no fixed number of topics can be prescribed as course contents. He is expected to know his subject in depth, however, emphasis should be on the diseases / health problems most prevalent in that area. Knowledge of recent advances and basic sciences as applicable to his / her speciality should get high priority. Competence in surgical skills commensurate with the speciality (actual hand on training) must be ensured.

General topics

The activities may be organised as a common teaching programme for postgraduate students of all the departments at institution/university level. A possibility of conducting the programme on regional basis in collaboration with professional bodies/associations, Medical Council of India, University Grants Commission and others may also be explored."

1. History of medicine with special reference to ancient Indian texts.
2. Health economics - basic terms, health insurance.

3. Medical sociology, doctor-patient relationship, family adjustments in disease, organisational behaviour, conflict resolution.
4. Computers - record keeping, computer aided learning, virtual reality, robotics.
5. Hazards in hospital and protection Aids, hepatitis B, tuberculosis, radiation, psychological
6. Environment protection - bio-medical waste management.
7. Disaster management, mass casualties
8. Medical audit, evidence based medicine, quality assurance.
9. Concept of essential drugs and rational use of drugs.
10. Procurement of stores and material management
Personal management
11. Research methodology -library consultation, formulating research, selection of topic, writing protocol thesis, ethics.
12. Bio-medical statistics, clinical trials.
13. Medical ethics
14. Consumer protection.
15. Newer antibiotics Problem of resistance
16. D.T. design, technologies, equipment.
17. Advances in imaging technologies
18. Response to trauma Sepsis - SIRS
19. Critical care in surgical practice
20. Wound healing
21. Fluid and electrolyte balance
22. Nutrition
23. Blood transfusion
24. Nosocomial infection
25. Brain death
26. Cadaveric organ retrieval

Systemic Surgery

A list of topics or sub-topics in systemic surgery does not appear to be required. A standard textbook may be followed, which will also identify the level of learning expected of the trainees.

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Syllabus and Curriculum for MD MICROBIOLOGY 2012

1.GOAL:

The main aim of this course is to train students of Medicine in the field of medical Microbiology. Theoretical and practical training is imparted to the candidates in various sub specialties of medical Microbiology so that they can participate in good patient care and prevention of infectious diseases in the community. They are introduced to basic research methodology so that they can plan and conduct fundamental and applied research. They are also imparted training in teaching methods in the subject which may enable them to take up teaching assignments in medical institutions.

2:OBJECTIVES:

At the end of the course the student will be able to :

- a. Establish good "laboratory medicine" in hospital and community in the field of Bacteriology, Mycology, Virology, Parasitology and Immunology.
- b. Plan, execute and evaluate teaching assignments of Microbiology in medical colleges.
- c. Plan, execute and analyze applied and fundamental research in various branches of microbiology involving other related disciplines for health care.

3: METHOD OF TRAINING:

General Principles: Acquisition of practical competencies being the keystone of postgraduate medical education, postgraduate training is skills oriented. Learning in postgraduate program is essentially self-directed and primarily emanating from laboratory practical and academic work. The formal sessions are merely meant to supplement this core effort.

Teaching Schedule

The suggested departmental teaching schedule is as follow:-

1. Didactic Lectures(1st Six months) aims at the Standard Operative Procedure of Different laboratories of the Department.
2. Seminar - - - Once a week
3. PG Practical - - - Once a week
4. Journal club - - - Once a week
5. PG discussion - - - Once a week
6. Thesis/Case Discussion - - - Once a week

4: SYLLABUS (COURSE CONTENT):

The syllabus can be divided into different sub divisions as follows:

A.General Microbiology

1. History of Microbiology
2. Microscopy
3. Bio-safety including universal precautions
4. Morphology of bacteria and other microorganisms
5. Nomenclature and classification of microbes
6. Growth and nutrition of bacteria
7. Bacterial metabolism
8. Sterilization and disinfection
9. Bacterial toxins
10. Bacterial antagonism: Bacteriocins, Bdellovibrio and other alike organisms
11. Bacterial genetics and relation with bacteriophage
12. Molecular genetics relevant for medical microbiology including gene cloning
13. Antibacterial substances used in the treatment of infections and drug resistance in bacteria
14. Bacterial ecology: Normal flora of the human body, Hospital environment, Air, water and milk
15. Host parasite relationship
16. Quality assurance, quality control and accreditation of microbiology laboratory.

B.Immunology

1. The immune system
2. Innate and acquired immunity
3. Cells involved in immune response
4. Antigens
5. Immunoglobulins
6. Complement
7. Antigen and antibody reactions
8. Hypersensitivity
9. Cell mediated immunity
10. Immunodeficiency
11. Autoimmunity
12. Immune tolerance
13. M.H.C. and Transplantation immunity
14. Tumor immunity
15. Immuno prophylaxis and immunotherapy
16. Measurement of immunity
17. Immunological techniques
18. Immunopotiation and immunomodulation

C. Systematic Bacteriology

1. Isolation, description and identification of bacteria
2. Gram positive cocci of medical importance including *Staphylococcus*, *Micrococcus*, *Streptococcus*, anaerobic cocci, etc.
3. Gram negative cocci of medical importance including *Neisseria*, *Branhamella*, *Moraxella*, etc.
4. Gram positive bacilli of medical importance including *Lactobacillus*, Coryneform organisms, *Bacillus* & aerobic bacilli, *Actinomyces*, *Nocardia*, *Actinobacillus* and other Actinomycetales, *Erysipelothrix*, *Listeria*, *Clostridium* and other spore bearing anaerobic bacilli, etc.
5. Gram negative bacilli of medical importance including *Vibrio*, *Aeromonas*, *Pleisiomonas*, *Haemophilus*, *Bordetella*, *Brucella*, *Gardnerella*, *Pseudomonas* & other non-fermenters, *Pasturella*, *Francisella*, *Bacteroides*, *Fusobacterium*, *Leptotrichia*, and other anaerobic Gram negative bacilli, etc.
6. *Helicobacter*, *Campylobacter* and *Spirillum*
7. The Enterobacteriaceae
8. Mycobacteria
9. The Spirochaetes
10. *Chlamydiae*
11. *Rickettsia*, *Coxiella*, *Bartonella*
12. Mycoplasmatales: *Mycoplasma*, *Ureaplasma*, *Acholeplasma*
13. Miscellaneous bacteria

D. Virology

1. The nature of viruses
2. Classification of viruses
3. Morphology: virus structure
4. Virus replication
5. The genetics of viruses
6. The pathogenicity of viruses
7. Epidemiology of viral infections
8. Laboratory diagnosis of viral infections
9. Vaccines and anti-viral drugs
10. Bacteriophages
11. DNA viruses of medical importance including Poxviridae, Herpesviridae, Adenoviridae, Hepadnavirus, Papova and Parvoviruses, etc.
12. RNA viruses of medical importance including, Enteroviruses, Togaviridae, Flaviviruses, Orthomyxoviruses, Paramyxoviruses, Reoviridae, Rhabdoviridae, Arenaviridae, Bunyaviridae, Retroviridae, Filoviruses, Human immunodeficiency virus, Arboviruses, Coronaviridae, Calciviruses, etc.
13. Slow viruses and Prions

14. Human immunodeficiency viruses
15. Oncogenic viruses
16. Viruses of gastroenteritis
17. Miscellaneous and newer viruses
18. Viroids and virusoids

E.Parasitology

1. General characteristics and classification of parasites
2. Pathogenesis and pathology of parasitic infections.
3. Protozoan parasites of medical importance including *Entamoeba*, *Giardia*, *Balantidium coli*, *Trichomonas*, intestinal coccidian parasites, *Toxoplasma*, *Sarcocystis*, blood parasites including *Plasmodium*, *Babesia*, *Leishmania*, *Trypanosoma*.
4. Cestodes and Trematodes of medical importance including, *Diphyllobothrium latum*, *Spirometra*, *Taenia*, *Echinococcus*, *Hymenolepis*, *Dipylidium caninum*, *Schistosoma*, *Fasciola*, *Fasciolopsis buski*, *Paragonimus*, *Clonorchis*, other trematodes.
5. Nematodes of medical importance including, nematodes such as *Trichuris*, *Trichinella*, *Capillaria*, *Strongyloides*, *Ancylostoma*, *Necator*, *Enterobius*, *Ascaris*, *Toxocara*, agents causing larva migrans, tissue nematodes including, Filarialworms, *Dracunculus medinensis*.
6. Ectoparasites: Common arthropods and other vectors viz. Mosquito, Sandfly, Ticks, Mite, Cyclops
7. Common laboratory methods including common culture methods in Parasitology.
8. Antiparasitic agents.
9. Immunity mechanisms in parasitic infections.

F.MYCOLOGY

1. The morphology and reproduction of fungi and antimycotic agents
2. Classification of fungi
3. Contaminant and opportunistic fungi including *Candida*, *Cryptococcus*, *Pneumocystis*, *Aspergillus*, *Zygomycetes*, *Penicillium marneffeii*.
4. Superficial mycotic fungi including Dermatophytes.
5. Fungi causing subcutaneous mycoses including mycetoma and rhinosporidiosis.
6. Fungi causing systemic infections including *Histoplasma*, *Blastomyces*, *Coccidioides*, *Paracoccidioides*, *Sporothrix*.
7. Keratomycosis and otomycosis.
8. Fungal toxicosis.
9. Antifungal agents and *in-vitro* antifungal susceptibility testing.

G. APPLIED MICROBIOLOGY :

1. Epidemiology of Infectious diseases.
2. Hospital acquired infections.

3. Management of hospital waste.
4. Investigation on an infectious outbreak.
5. Infections of various organs and systems of human body viz. respiratory tract infections, urinary tract infections, central nervous system infections, congenital infections, reproductive tract infections, gastrointestinal infections, hepatitis, pyrexia of unknown origin, infections of eye, ear & nose, septicemia, endocarditis, haemorrhagic fevers etc.
6. Opportunistic infections.
7. Emerging and re-emerging infections.
8. Information technology in microbiology.
9. Automation in microbiology.
10. Statistical analysis of microbiological data and research methodology.
11. Care & handling of animals.
12. Animal and human ethics involved in microbiological work.

5. SKILLS FOR POSTGRADUATE STUDENTS IN MD MICROBIOLOGY :

Bacteriology- Must Acquire

1. Preparation and pouring of media-nutrient agar, blood agar, MacConkey agar, fermentation media, serum sugars, Kigler Iron agar, Robertson's cooked meat medium, Lowenstein-Jensen's medium, Sabouraud's dextrose agar.
2. Operation of autoclave, hot air oven, distillation apparatus, filters like Seitz and membrane filters, different types of refrigerators, centrifuge machines, inoculation hoods, incubators, Bunsen burners etc.
3. Washing and sterilization of glass wares (plugging and packing) and sterility control.
5. Disposal of contaminated materials and cultures.
6. Testing of disinfectants : phenol coefficient and "in use" tests
7. Quality control of media, reagents, etc
8. Aseptic practices in laboratory and safety precautions.
9. Care and maintenance of Desk Top computers, printers, UPS, CPU, Scanners etc.
10. Preparation of antibiotic discs: performance antibiotic sensitivity tests by Kirby Bauer, Stokes method, etc. Estimation of minimal inhibitory/bactericidal concentration by tube/plate dilution methods, E-Test.
11. Tests for β -lactamases, ESBL, AmpC, Metallobetalactamases
12. Collection of specimens for microbiological investigations on blood, urine, throat swab, rectal swab, stool, pus (swabs), OT specimens
13. Identification of bacteria of medical importance up to species level (except anaerobes which could be up to generic level)
14. Techniques of anaerobiosis, anaerobic jars using different available methods.
15. Preparation of stains viz. Grams, Albert, capsule, spores, Ziehl-Neelsen etc. and performance of staining.

16. Care and operation of microscopes viz. light, dark ground, phase contrast and fluorescence microscopes
17. Care and breeding of laboratory animals viz. mice, rats, guinea pigs and rabbits
18. Bleeding techniques from animals including sheep
19. Inoculation of infective material by different routes in the animals
20. Preparation, examination and interpretation of direct smears from clinical specimens viz. sputum for AFB-ZN, auramine O, slit smears for *M.leprae* for ZNstaining, conjunctival smears for Chlamydia by Giemsa/Iodine
21. Quantitative analysis of urine by pour plate method and semiquantitative analysis by standard loop test for finding significant bacteriuria
22. Plating of clinical specimens on media for isolation, purification, identification and quantification purposes
23. Tests for motility: hanging drop, Craigie's tube, dark ground examination for Spirochaetes.
24. In-vitro toxicity tests-Elek's test, Nagler's reaction
25. Skin tests : Mantoux
26. Special tests-bile solubility, chick cell agglutination, sheep cell haemolysis, niacin and catalase tests for Mycobacterium, satellitism, CAMP test, catalase, slide agglutination tests
27. Bacteriological test for air, water and milk.
28. Maintenance and preservation of bacterial cultures.

Bacteriology-Desirable to acquire

1. Conjugation experiments for drug resistance
2. Serum antibiotic assays e.g. Gentamicin
3. Phage typing for *Staphylococcus*, *S. typhi* etc.
4. Bacteriocin typing viz. Proteocin, etc.
5. Enterotoxigenicity tests like rabbit ileal loop, intragastric inoculation of infant mouse, Sereny's test
6. Performance of autopsies on the animals
7. Animal pathogenicity / toxigenicity tests for *C. diphtheriae*, *C. tetani*, *S.pneumoniae*, *S.typhimurium*, *K. pneumoniae* etc.
8. Serological grouping of *Streptococcus*
9. Antibiotic susceptibility tests for Mycobacteria
10. Molecular typing methods.
11. Special staining techniques for Mycoplasma, Treponemes, Gardenerella.

Immunology-Must acquire

1. Collection of blood by venepuncture, separation of serum and preservation of serum for short and long periods
2. Preparation of antigens from bacteria, eg. Widal and their standardization
3. Raising of antisera in laboratory animals

4. Performance of serological tests viz. Widal, Brucella tube agglutination, Cold agglutination, VDRL, Paul-Bunnell, ASO, CRP, Rheumatoid Factor, IFA, Immuno Chromatographic Test,
5. Enzyme linked immunosorbent assay
6. Latex and Staphylococcal Co-agglutination tests

Immunology-desirable to acquire

1. Radial immunodiffusion for estimation of serum immunoglobulins
2. Immunoelectrophoresis
3. Crossed immunoelectrophoresis
4. Immunodiffusion in gels, (Ouchterlony) counter immunoelectrophoresis
5. Haemolysis and complement fixation.
8. T-cell rosetting
9. Separation of lymphocytes by centrifugation, gravity sedimentation, etc

Mycology-Must acquire

1. Collection and transport of specimens
2. Direct examination of specimens by KOH, Gram's, Kinyoun's, Giemsa, Lactophenol cotton blue stains
3. Calcofluor staining and examination under fluorescent microscope.
4. Examination of histopathology slides for fungal infections
5. Isolation and identification of common laboratory contaminants, dermatophytes and others of medical importance (yeast, dematiaceous fungi)
6. Special techniques like Wood's lamp examination, hair baiting, hair perforation, paraffin baiting and slide culture
7. Maintenance of stock cultures

Mycology-Desirable to acquire

1. Animal pathogenicity tests viz. intracerebral and intraperitoneal inoculation of mice for *Cryptococcus*
2. Antigen and antibody based serological test in fungal diseases including *Candida*, *Cryptococcosis*, *Aspergillus*, etc.

Parasitology-Must Acquire

1. Examination of feces for parasitic ova and cysts etc. by direct and concentration methods (salt floatation and formal-ether methods)
2. Egg counting techniques for helminthes
3. Examination of blood for protozoa and helminthes by wet mount and thin and thick stained smears
4. Examination of other specimens e.g. urine, CSF, bone marrow etc. for parasites
5. Histopathology sections-examination and identification of parasites
6. Performance of stains- Leishman, Giemsa.
7. In-vitro culture of parasites like *Entamoeba*, *Leishmania*, etc.
8. Preparation of media-NIH, NNN, etc.
9. Copro-culture of larva of hookworms

10. Skin tests : Casoni's test.
11. Identification of common arthropods and other vectors viz., mosquito, sandfly, tick, mite, Cyclops
12. Collection of specimens
13. Preservation of parasites- mounting, fixing, staining, etc.
14. QBC for malaria.

Parasitology-Desirable to Acquire

1. Permanent staining techniques like iron haematoxylin
2. *In-vitro* culture of *Plasmodium falciparum*
3. Antigen based and antibody based serological diagnostic tests such as IHA, ELISA, Western blot, etc for cysticercosis, amoebiasis, hydatid disease, filariasis, etc.

Virology-Must acquire

1. Preparation of glass wares for tissue cultures (washing, sterilization)
2. Preparation of media like Hanks, MEM
3. Preparation of clinical specimens for isolation of viruses
4. Maintenance of continuous cell lines by subcultures. Preservation in -70°C and liquid nitrogen
5. Recognition of CPE producing viruses
6. Serological tests-ELISA for HIV, ELISA for HBsAg, HCV, Hepatitis virus, serological tests for arboviruses.
7. Chick embryo techniques-inoculation and harvesting
8. Handling of mice, rat, guinea pigs for collection of blood, pathogenicity tests, etc.

Virology-Desirable to acquire

1. Performance of haemadsorption for Parainfluenza, Haemagglutination for Influenza, Immunofluorescence, neutralization for Enteroviruses and Respiratory viruses, identification tests on tissue cultures and supernatants, etc.

6: GUIDELINES FOR WRITING THESIS :

- Every candidate shall carry out work on an assigned research project under the guidance of a recognized Postgraduate Teacher, the project shall be written and submitted in the form of a Thesis
- Every candidate shall submit thesis plan to the university as per university guidelines
- Thesis shall be submitted to the university as per university guidelines.
- The student will Identify a relevant research question; (ii) conduct a critical review of literature; (iii) formulate a hypothesis; (iv) determine the most suitable study design; (v) state the objectives of the study; (vi) prepare a study protocol ; (vii) undertake a study according to the protocol; (viii) analyze and interpret research data, and draw conclusions; (ix) write a research paper.

7: TIME FRAME FOR MINIMUM SKILL ACQUISITION BY PG STUDENTS :

General Microbiology and Bacteriology

First year

- Media and reagent preparation
- Operation of autoclave, hot air oven
- Washing and sterilization of glass wares
- Laboratory waste management
- Aseptic practices in laboratory and safety precautions
- Care and maintenance of common laboratory equipments
- Preparation and performance of common bacterial stains
- Collection of specimens for microbiological investigations
- Care and operation of microscopes
- Preparation, examination and interpretation of direct smears from clinical specimens
- Motility testing of bacteria
- Plating of clinical specimens on media

Second year

- Quality control of media and reagents
- Quantitative and semi-quantitative analysis of urine
- Skin tests
- Preparation of antibiotic discs
- Estimation of MIC, MBC, and tests for β -lactamases
- Identification of bacteria of medical importance up to species level
- Care and breeding of laboratory animals

Third year

- Techniques of anaerobiosis
- Bleeding techniques from animals
- Inoculation of infective material by different routes in the animals
- Performance of autopsy on the animals
- Animal pathogenicity / toxigenicity tests and in-vitro toxicity tests
- Special tests

Immunology

First year

- Collection of blood by venepuncture
- Separation of serum and preservation of serum for short and long periods
- Preparation of antigens from bacteria or tissues like Widal, VDRL, etc and their standardization
- Latex and Staphylococcal Co-agglutination tests
- Preparation of adjuvants like Freund's adjuvant

Second year

- Performance of serological tests viz. Widal, Brucella tube agglutination, Weil-Felix, Cold agglutination, VDRL, Paul-Bunnell, Rose-Waaler, IF
- Raising of antisera in laboratory animals
- Enzyme linked immunosorbent assay
- Separation of lymphocytes by centrifugation, gravity sedimentation

Third year

- Counter immunoelectrophoresis
- Haemolysin and complement titration
- Leukocyte migration test
- T-cell rosetting
- Radial immunodiffusion for estimation of serum immunoglobulins
- Immunoelectrophoresis
- Crossed immunoelectrophoresis
- Neutrophil phagocytosis

Mycology

First year

- Collection of specimens
- Direct examination of specimens by KOH, Gram's, Kinyoun's, Giemsa, Lactophenol cotton blue stains

Second year

- Isolation and identification of common laboratory contaminants, dermatophytes and others of medical importance (yeast, dematiaceous fungi)
- Maintenance of stock cultures

Third year

- Examination of histopathology slides for fungal infections
- Special techniques like Wood's lamp examination, hair baiting, hair perforation, paraffin baiting and slide culture
- Animal pathogenicity tests viz. intracerebral and intraperitoneal inoculation of mice for *Cryptococcus*

Parasitology

First year

- Collection of specimens
- Examination of feces for parasitic ova and cysts etc. by direct and concentration methods (salt floatation and formal-ether methods)
- Examination of blood for protozoa and helminthes by wet mount and thin and thick stained smears
- Performance of stains- Leishman, Giemsa
- Preservation of parasites- mounting, fixing, staining, etc.
- Preparation of media-NIH, NNN, etc.

Second year

- Egg counting techniques for helminthes
- Examination of other specimens eg. urine, CSF, bone marrow etc. for parasites
- In-vitro culture of parasites like *Entamoeba*, *Leishmania*, etc.
- Copro-culture of larva of hookworms
- Antigen preparation-viz. *Entamoeba*, filarial, hydatid for serological tests like IHA and skin tests like Casoni's test
- Serological tests like IHA, ELISA, Co-A

Third year

- Histopathology sections-examination and identification of parasites
- Identification of common arthropods and other vectors viz., mosquito, sandfly, tick, mite, Cyclops
- Permanent staining techniques like iron haematoxylin
- Maintenance of *Toxoplasma gondii* in mice

Virology

First year

- Preparation of media like Hanks, Eagle's MEM, Viral transport media.
- Preparation of clinical specimens for isolation of viruses.
- Serological tests-ELISA for HIV, HBV, HCV etc.
- Embryonated egg inoculation.

Second year

- Preservation in -70°C and liquid nitrogen
- Handling of mice, rat, guinea pigs for collection of blood, pathogenicity tests, etc.

Third year

- Recognition of CPE producing viruses
- Haemagglutination for Influenza
- Immunofluorescence

8.ASSESSMENT :

All the PG students are assessed daily for their academic activities and also periodically.

General Principles

- The assessment is valid, objective, and reliable.
- It covers cognitive, psychomotor and affective domains.
- Formative, continuing and summative (final) assessment is also conducted in theory as well as practical / clinical. In addition, thesis is also assessed separately.

Summative Assessment

- Ratio of marks in theory and practical will be equal.
- The pass percentage will be 50%. marks
- Candidate will have to pass theory and practical examinations of internal assessment or final examination separately.

Marks for examinations: The examinations shall be organized on the basis of marking system to evaluate and certify candidate's level of knowledge, skill and competence as per distributions mentioned below. In total the overall assessment for a postgraduate shall be for **1000 marks** distributed as follows.

A.Internal assessment exam(200 marks)

- | | |
|---|----------------------------------|
| a. Theory | 15 marks x5six monthly terms =75 |
| b. Practical (Oral, clinical and practical) | 15 marks x5six monthly terms =75 |
| c. <u>Log book evaluation</u> | 10 marks x5six monthly terms =50 |

Total : 200

B.Final MD/MS exam(800 marks)

Theory (100 x 4 Papers)	400
Practical	300
Viva (Oral)	100

I)Practical (300 marks)

Ex.1 Bacteriology	
a)Clinical exercise	80 marks
b)Identification of pure culture	40 marks
Ex.2 Mycology	40 marks
Ex.3 Spots	40 marks
Ex.4 Serology	30 marks
Ex.5 Virology	20 marks
Ex.6 Animal Inoculation	20 marks
Ex.7 Parasitology	10 marks
Pedagogic skill	20 marks

II) Viva(100 marks)	Thesis Viva	20 marks
	Grand Viva	80 marks

Grand Total (A+B)= 1000 marks

9. Job Responsibilities

During 1st year the resident will work under direct supervision of the Faculties /Sr. Resident / 2nd yr & 3rd yr residents and will be responsible for handling and processing of the specimens in their respective sections. During 2nd yr, they will be responsible for reporting in their respective sections under supervision. During 3rd yr, they should be able to handle all the emergencies in the evening and night duties as appropriate. All the junior residents should be able to take practical demonstrations of Under graduates.

10. MODEL QUESTION PAPERS :Theory Examination

There will be four papers. Each paper of 3 hours duration.

Paper I : General Microbiology and Immunology

Paper II : Systematic Bacteriology and Mycology

Paper III : Virology and Parasitology

Paper IV : Applied microbiology and recent advances

PAPER I – GENERAL MICROBIOLOGY & IMMUNOLOGY

Time: 3 hours Max. Marks: 100

One structured essay question = 20 marks,

Eight short essay type questions = 8x10 = 80marks.

Note: Answer all questions

1. Discuss the principle and methods of preparation of monoclonal antibodies.

Describe its clinical applications. (20)

2. Write short notes on:(8x10)

a) Advances in culture of anaerobic bacteria

b) Transposable genetic elements

c) Virulence factors of a Bacteria

d) Chemical sterilants

e) Application of electron microscopy in diagnostic microbiology

f) MHC

g) Tumor escape mechanism

h) ELISA

PAPER II – SYSTEMATIC BACTERIOLOGY AND MYCOLOGY

Time: 3 hours Max Marks: 100

Note: Answer all questions

1. Describe the newer concepts in taxonomy and nomenclature of *Leptospira* species.

Discuss the epidemiology and laboratory diagnosis of leptospirosis. (20)

2. Write short notes on : (8x10)

a) Melioidosis

b) Leprosy eradication in India

c) NAG vibrios

d) *Penicillium marnefei*

e) Non- albicans *Candida* spp.

f) Histoplasmosis in India

g) Maduramycosis

h) Immunological diagnosis of fungal infections

PAPER III – VIROLOGY AND PARASITOLOGY

Time: 3 hours Max. Marks: 100

Note: Answer all questions

1. Describe recent concepts in understanding *Entamoeba histolytica*, *Entamoeba dispar* and other look-alike species. (20)
2. Write short notes on : (8x10)
 - a) Pathogenesis and laboratory diagnosis of neurocysticercosis
 - b) Vaccine trial against Malaria
 - c) Pathogenesis and laboratory diagnosis of lymphatic filariasis
 - d) Avian Influenza
 - e) Prion mediated diseases
 - f) Dengue virus
 - g) Serology of HBV
 - h) Antivirals

PAPER IV - APPLIED MICROBIOLOGY AND RECENT ADVANCES

Time: 3 hours Max Marks: 100

Note: Answer all questions

1. Discuss automation methods in clinical microbiology. (20)
2. Write short notes on : (8x10)
 - a) Chimeric antibodies
 - b) Opportunistic infections in HIV
 - c) Antigen detection in non-blood specimens for diagnosis of infectious diseases
 - d) Newer concepts in the pathogenesis of urinary tract infection
 - e) Disposal of hospital wastes
 - f) Nano technology for microbiology
 - g) Bacteriological analysis of municipality water supply for 1 lakh population
 - h) Heat shock protein.

3. Practical Examination

Duration: Three days

The examination will consist of the following exercises conjointly conducted and evaluated by four examiners, two internals and two externals.

1. Exercise in Clinical Bacteriology-

Isolation and identification of bacteria from clinical specimen

2. Exercise in Bacteriological Techniques-

Isolation and identification of bacteria given in pure culture

3. Animal experiment-

Any one of:

- bleeding of rabbit/guinea pig/mouse/rat
- Post mortem examination of laboratory infected animal
- Inoculation of infective material into laboratory animal and isolation of the pathogen

4. Exercise in Virology-

- Egg inoculation.

5. Identification of fungi

- From cultures or Histopathological sections.

6. Exercise in Parasitology-

- Examination of stool for ova and cysts by direct and concentration techniques
- Examination of microscopic slides (Smears or Histopathological slides)

7. Exercise in Immunology

- Any one of the serological techniques used in clinical medicine

Oral examination: The oral examination consists of questioning on the dissertation and overall subject matter. It will be conducted by all the four examiners as in the case of the practical examination. This also includes a seminar presentation for at least of 15 minutes duration.

10:Recommended Textbooks.

The under mentioned references are only a guideline. If any mistakes are there in a particular reference cited, it is the responsibility of the candidate to verify the facts from different sources before accepting it as a gold standard and reproducing it in any manner.

1. Topley and Wilsons Microbiology and microbial infections, 10th edition(2008),ASM Press.
2. Mackie& Mc Cartney's Practical Medical Microbiology,14th edition,1999-Indian Reprint-2006 edtd by Colle J.G.etal.
3. Anaissie Elias J. Clinical Mycology, Churchill livingstone 2nd edition,2003.
4. Bailey and Scott's Diagnostic Microbiology. 12th ed. CV Mosby,2007.
5. Roitt Ivan M, Immunology 10th edition Blackwell Science 1994.
6. Stites Basic Immunolgy 10th edn, 2001.
7. Koneman EW, Allen SD, Schreckenber PC, Winn WC (Eds): Color Atlas and Textbook of diagnostic Microbiology, 6th Ed.2006.
- 8.Lynn S. Gracia,Diagnostic Medical Parasitology-4th Ed.2001,ASM Press.
9. Manual of Clinical Microbiology, 6th Ed.2005,Edtd by Murray R.R. et al.,ASM Press.
10. Fundamental Immunology,William E. Paul,Lippincott,6th Ed.2008.

11.SUGGESTED SCHEDULE OF ROTATION

Intrinsic rotation (Spread over equally into 3 academic years)

1. Bacteriology (Aerobic and anaerobic)	-	-	6 months.
2. Mycobacteriology	-	-	3 months.
3. Hospital infection surveillance	-	-	3 months.
4. Serology/Immunology	-	-	6 months.
5. Mycology	-	-	3 months.
6. Virology/HIV	-	-	3 months.
7. Parasitology	-	-	3 months.

Extrinsic rotation

1. Clinical Pathology	-	-	6 months
2. Elective posting	-	-	3 months

Total 36 months

Journals

1. Indian Journal of Medical microbiology
2. Clinical Microbiology Reviews.
3. Journal of Clinical Microbiology.
4. Journal of Medical Microbiology.
5. Journal of AIDs.
6. Jouurnal of Hospital Infection.
7. Indian Journal of Tuberculosis and Lung Diseases.
8. Indian Joournal of Medical Research.
9. JAAC.
10. Parasitology Today.
11. Journal of Infection.
12. Infection Control and Hospital Epidemiology.
13. Indian Journal of Tuberculosis.
14. Journal of Associations of Physicians of India.
15. Lancet-infectious Disease.
16. Emerging Infectious Diseases-online.
17. New England Journal of Medicine-online.
18. British Medical Journal.
19. Scandinavian Joournal of Infectious Diseases.
20. ICMR Bulletin.
21. AIDS Research & Review.
22. MMWR
23. Tubercle.
24. WHO Bulletin.
25. Journal of Americal Medical Association.
26. Paediatric infectious diseases.
27. Indian Journal of Leprosy.
28. International Journal of Leprosy.
29. Immunology
30. American Journal of Epidemiology.

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Syllabus and Curriculum for MS - OBSTETRICS AND GYNAECOLOGY -2012-

Preamble

The purpose of this programme is to standardize Obstetrics & Gynaecology teaching at Post Graduate level through out the country so that it will benefit in achieving uniformity in undergraduate teaching as well and resultantly creating competent Obstetrician and Gynaecologist with appropriate expertise

Programme Objectives

The goal of MD course in Obstetrics and Gynaecology is to produce a competent Obstetrician and Gynaecologist who:

- recognizes the health needs of women and adolescents and carries out professional obligations in keeping with principles of National Health Policy and professional ethics
- has acquired the competencies pertaining to Obstetrics and Gynaecology that are required to be practiced in the community and at all levels of health system
- has acquired skills in effectively communicating with the family and the community
- is aware of the contemporary advances and developments in medical sciences as related to Obstetrics and Gynaecology ..
- is oriented to principles of research methodology
- has acquired skills in educating medical and paramedical professionals

Specific Learning Objectives

At the end of the MDIMS Course in Obstetrics and Gynaecology, the student should be able to:

- a. Provide quality care to the community in the diagnosis and management of Antenatal, Intra-natal & Post natal period of Normal and abnormal pregnancy.
- b. Provide effective & adequate care to the Obstetrical and neonatal diseases.
- c. Manage common Gynecological problems & Emergencies.
- d. Provide counseling and delivery of fertility regulation methods and perform medical termination of pregnancy.
- e. Organize and implement the "National Health Programs" pertaining to Women's health.

- f. Develop adequate surgical skills to manage common Obstetrical & Gynecological problems.
- g. Have knowledge of the basic principles of Anesthesiology and resuscitative measures.
- h. Properly maintain medical records and know the Medica legal aspects and acts in respect of Obstetrical & Gynecological practice.
1. Plan and carry out scientific research (clinical / experimental) in specialty of Obstetrics & Gynecology.
- J. Keep abreast with advances in the field of Obstetrics & Gynecology.
- k. Involved in educational program in Obstetrics & Gynecology (with seniors) far medical & paramedical staff and also for the society.
 1. Be familiar with modern methods of teaching.
- m. Develop communication skill and demonstrate compass 'onate attitude towards the patients.

Postgraduate Training

Theoretical teaching should be imparted to the students through:

- Lectures, seminars, symposia, Inter & intra departmental meetings (clinic-pathological, Radio-diagnosis, Radiotherapy, Anesthesia, Pediatrics/Neonatology), Maternal morbidity/mortality meetings and journal club. *Records ofthe/-e are to be maintained by the department.*
- By encouraging and allowing the students to attend and actively participate in CMEs, Conferences by presenting papers.
- Entrusting to carry out a research project.
- Maintenance of log book
- Writing thesis / Dissertation (only for P.G. degree course)
- Active involvement in undergraduate teaching.

PRACTICAL & CLINICAL TRAINING

- Emphasis should be selflearning, group discussions and case presentations.
- Student should be trained about proper History taking, Clinical examination, advising / ordering relevant necessary investigations, their interpretation and instituting medical / surgical management by posting students in OPD, specialty clinics, wards, operation theaters, Labour room, family planning clinics and other departments like anesthesiology, neonatology, radiology/ radiotherapy.
- *Details ol3 years posting in Resident program (6 semesters ol6 months each)*
 - a. Allied posts should be done during' the course - for 8 weeks
 - i. Neonatology - 2 weeks
 - iii. Anaesthesia - 2 weeks
 - iii. Radiology/Radiotherapy - 2 weeks
 - iv. Surgery - 2 weeks
 - b. Details of training in the subject during resident posting
The student should attend to the duties (Routine and emergency):

Out patient Department and special clinics

Inpatients

Operation Theater.

Labour Room.

Writing clinical notes regularly and maintains records.

1st Semester - working under supervision of senior residents & teaching faculty.

2nd & 3rd semester - Besides -p at ie nt care in O.P.D., wards, Casuality and labour room, carrying out minor operations under supervision & assisting in major operation.

4th 5th & 6th semester - independent duties in management of patient (including major operations· under supervision of teaching faculty)

c. Surgeries to be done during PG training. (Details in the Syllabus)

Assessment:-

General Principles

- The assessment should be valid, objective, and reliable.
- It must cover cognitive, psychomotor and affective domains.
- Formative, continuing and summative (final) assessment should be conducted in theory as well as practicals/clinicals. In addition, thesis should be assessed separately.

Overall Weightage

Internal assessment - 20%

Final summative examination - 80%

Formative assessment

The formative assessment should be continuous as well as end-of-term. The former should be based on the feedback from the senior residents and the unit faculty concerned. End-of-term assessment should be held at the end of each semester (upto the 5th semester). Formative assessment will not count towards pass/fail at the end of the program, but will provide feedback to the candidate. Scheme of internal assessment examination It is held by means of a written test and practical (and or clinical) with viva examination by all consultants of the department as per distribution of marks as follows. In such five six monthly tests a candidate shall be evaluated for 1000 marks in total i.e. 200 marks in each term as follows.

Item	1st term	2nd term	3rd term	4th term	5th term
Theory	75 marks	75 marks	75 marks	75 marks	75 marks
Oral, Practical/clinical	75 marks	75 marks	75 marks	75 marks	75 marks
Log book evaluation	50 marks	50 marks	50 marks	50 marks	50 marks
Total	200 marks	200 marks	200 marks	200 marks	200 marks
Gross total	1000 marks				
Carried forward to Final MD/MS Examination	20 % marks ~ 200 marks				

200 marks shall be carried over a period of five terms as follows.

- Log book evaluation- 10 x 5terms= 50 marks
- Theory exam 15 x 5terms= 75 marks
- Oral ,Practical/Clinical exam 15 x 5terms= 75 marks

Evaluation of the Log book:

Each candidate should be required to maintain a log book in which following details will be entered and evaluated on a scale of 1 to 10. At end of each term of 6months of training for 5such terms the logbook will be evaluated and a score is to be calculated out from a maximum of 100 marks for the 10 items as entered in the logbook.

- i. skills learned independently, under supervision or assisted by him. 1 to 10
- ii. Presentations in journal clubs1 to 10.
- iii. Cases presented in clinical meetings 1 to 10
- iv. Presentation in departmental seminars..... 1 to 10
- v. Intra and interdepartmental training and evaluation details.....1 to 10
- vi. Teaching activities.....1 to 10
- vii. Conferences/workshops/CME attended 1 to 10
- viii. Papers presented/published conferences.....1 to 10
- ix. Didactic lectures attended.....1 to 10
- x. Thesis progress and evaluation details.....1 to 10

MD Examination:

Pattern of question for theory Papers- There shall be four theory papers. One paper out of these shall be on ‘Basic Medical Sciences’ and one paper on ‘Recent Advances’ in the discipline. There shall be 100 marks for each paper to be answered in 3 hours’ time. There shall be ‘1 structured essay type question’ for 20 marks besides 8‘short essay type questions’ for 10 marks each in each paper.

Days of practical examination-Practical Examination should be conducted for a batch of upto 8 candidates over a minimum period of two to three days extendable up to 7days subject to the subject curriculum with due approval of the board of

examiners. For a batch of more than 8 the examination may extend accordingly. The theory papers shall be evaluated at the examination center itself before commencement of the practical/clinical and oral examination in the subject during these practical examination days.

Components of examination-It consist of a written examination, a practical examination to assess the clinical/practical competencies and skills, and a viva voce examination.

The examinations shall consist of

- A) theory
- B) practical including clinical
- C) oral

A.Theory-

The 4 papers in theory shall be conducted well in advance before the oral , clinical/practical examination.

B. Practical

Clinical/Practical examination is the most important part of the evaluation and is aimed at assessing the clinical/practical skills of the candidate and diagnostic reasoning. Entirely objective evaluation of these skills is neither feasible nor desirable. However, in order to test the various skills, the examiners may evaluate the candidates on a structured format.

C. Pedagogic Skill

The candidate shall be allotted a topic from the discipline at a short notice of few hours, (preferably on the first day of the examination) to prepare and present before the board of examiners within a time span of 15 minutes (preferably on the second day of the examinations) . The teaching skill will be evaluated under various points(as illustrated below) and marks given accordingly.

- (i) Choice of article/topic (unless specifically allotted)
- (ii) Completeness of presentation
- (iii) Clarity of presentation
- (iv) Understanding of the subject and ability to convey the same
- (v) Whether relevant references have been consulted
- (vi) Ability to convey points in favour and against the subject under discussion

- (vii) Use of audio-visual aids
- (viii) Ability to answer questions
- (ix) Time scheduling
- (x) Overall performance

D. Viva-Voce

a. Viva-voce is expected to be conducted at every stage of the practical examination. The resident will be required to answer oral questions on any aspect of the specialty. Oral examination is designed to test the general scientific background of the candidate and his/her own particular contribution embodied by the thesis. A formal "grand viva-voce" may be held at the end of the practical examination. Questions on the thesis/dissertation may be asked at this time as well. The board of examiners will conduct the examination. They will read out the comments & questions and will seek the answers from the candidate. The viva voce should be assessed under the following headings:

1. Thesis viva voce
2. Grand viva voce

All examiners shall be jointly responsible for all parts of the examination. In presence of the external examiners, the Chairman of the conducting board shall make the necessary arrangements for conducting the oral and practical including clinical examination at the department in the college centre .

b. The candidate shall bring the logbook and a copy of his/her thesis mandatorily while appearing for the oral, practical and clinical examination.

Marks for examinations: The examinations shall be organized on the basis of marking system to evaluate and certify candidate's level of knowledge, skill and competence as per distributions mentioned below. In total the overall assessment for a postgraduate shall be for 1000 marks distributed as follows.

A. Internal assessment exam(200 marks)

- Theory 15x5=75
- Practical (Oral, clinical and practical) 15x5=75
- Log book evaluation 10x5=50
- Total : 40x5=200

B. Final MD/MS exam (800 marks)

- Theory (100 x 4 Papers) 400
- Oral ,Clinical/Practical 400
- 1) Clinical/Practical (300 marks)
- Long exercise (one) 80 marks

Short exercise (three)	120 marks
OSPE(ten)	40 marks
Spots(ten)	40 marks
Pedagogic skill	20 marks
II) Viva	(100 marks)
Thesis Viva	20 marks
Grand Viva	80 marks
Grand Total	(A+B)= 1000 marks

PASS/FAIL- In order to pass the examination in each subject a candidate must secure not less than 50% marks in each head of passing which shall include (1) Theory (2) Practical including clinical and viva voce examination (3) internal assessment examination.

Pattern of MD/MS Examination:-

The PG examination shall be carried out in three parts:-

1.THESIS DESERTATION:

1. Topic of Thesis / Dissertation should be decided by the student in consultation with the teacher.
2. Thesis / Dissertation should be complete and should be submitted to the Board before the final examination.
3. Acceptance of the Thesis / Dissertation should be prerequisite to appear for the final Examination.

2.Theory :-

- There shall be 4 papers with 100 marks for 3hours duration of examination each.
- There shall be 2 structured essay type questions for 15 marks each along with short answer type questions for 10 marks each in each paper.
- The chapter distribution for the papers shall be as follows.

There should be 4 theory papers

PAPER I: Applied Basic sciences.

PAPER II: Obstetrics including social obstetrics & Diseases of New Born

PAPER III: Gynaecology

PAPER IV: Recent Advances in Obstetrics & Gynaecology

3.PRACTICAL EXAMINATION

OBSTETRICS:

Clinical

Long Case: 1 case

Short Case/ Spot Case: 1 case

Viva including

- i. Instruments
 - ii. Pathology specimens
 - iii. Drugs & X-rays, Sonography etc.
- IV. Dummy Pelvis

GYNACOLOGY

Clinical

Long Case: 1 case

Short Case/ Spot Case: 1 case

Viva including

- i. Instruments
- ii. Pathology specimens
- iii. Drugs & X-rays, Sonography etc.
- iv. Family planning

Course Content

Paper I

1. Basic Sciences

- Normal & abnormal development, structure and function (female & male) urogenital system and female breast.
- Applied Anatomy of genito-urinary system, abdomen, pelvis, pelvic floor, anterior abdominal wall, upper thigh (inguinal ligament, inguinal canal, vulva, rectum and anal canal).
- Physiology of Spermatogenesis.
- Endocrinology related to male and female reproduction. (Neurotransmitters).
- (Anatomy &) physiology of urinary & lower GI (Rectum / anal canal) tract.
- Development, structure & function of placenta, umbilical cord & amniotic fluid.
- Anatomical & physiological changes in female genital tract during pregnancy.
- Anatomy of fetus, fetal growth & development, fetal physiology & fetal circulation.
- Physiological & Neuro-endocrinal changes during puberty, adolescence, menstruation, ovulation, fertilization, climacteric & menopause.
- Biochemical and endocrine changes during pregnancy, including systemic changes in cardiovascular, hematological, renal, hepatic and other systems.
- Biophysical and biochemical changes in uterus and cervix during pregnancy & labour.
- Pharmacology of identified drugs used during pregnancy, labour, post partum period in reference to their absorption, distribution, excretion, (hepatic) metabolism, transfer of the drugs across the placenta, effect of the drugs (used) on labour, on fetus, their excretion through breast milk.
- Mechanism of action, excretion, metabolism of identified drugs used in the management of Gynaecological disorder.
- Role of hormones in Obstetrics & Gynaecology.

Markers in Obstetric & Gynaecology- Non neoplastic and Neoplastic

- Diseases
- Pathophysiology of ovaries, fallopian tubes, uterus, cervix, vagina and external genitalia in healthy and diseased conditions.
- Normal and abnormal pathology of placenta, umbilical cord, amniotic fluid and fetus.
- Normal and abnormal microbiology of genital tract. Bacterial, viral & parasitological infections responsible for maternal, fetal and gynaecological disorders.
- Humoral and cellular immunology in Obstetrics & Gynaecology.
Gametogenesis, fertilization, implantation & Early development of embryo.
- Normal Pregnancy, physiological changes during pregnancy, labour & puerperium.
- Immunology of pregnancy.
- Lactation.

2. Medical Genetics

- Basic medical genetics including cytogenetics.
- Pattern of inheritance
- Chromosomal abnormalities - types, incidence, diagnosis, management and recurrence risk.
- General principles of Teratology.
- Screening, counseling and prevention of developmental abnormalities.
- Birth defects - genetics, teratology & counseling.

Paper II

CLINICAL OBSTETRICS

1. Antenatal Care:

- Prenatal care of normal pregnancy including examination, nutrition, immunization & follow up:
- Identification and management of complications and complications of pregnancy - abortion, ectopic pregnancy, vesicular mole, Gestational Trophoblastic Diseases, hyperemesis gravidarum, multiple pregnancy, antipartum hemorrhage, pregnancy induced hypertension, preeclampsia, eclampsia, Other associated hypertensive disorders, Anemia, Rh incompatibility, diabetes, heart disease, renal & hepatic diseases, preterm - post term pregnancies, intrauterine fetal growth retardation,

- Neurological, hematological, dermatological diseases, immunological disorders and other medical & surgical disorders/ problems associated with pregnancy, Multiple pregnancies, Hydramnios, Oligiamnios.
- Diagnosis of contracted pelvis (CPD) and its management.

High-risk pregnancy -

- Pregnancy associated with complications, medical & surgical problems.
- Prolonged gestation.
- Preterm labour, premature rupture of membranes .
- Blood group incompatibilities.
- Recurrent pregnancy wastage.

Evaluation of fetal & maternal health in complicated pregnancy by making use of diagnostic modalities including modern ones (USG, Doppler, Electronic monitors) and plan for safe delivery for mother and fetus. Identifying fetus at risk & its management.

- Infections in pregnancy. (Bacterial, viral, fungal, protozoal)
- Malaria, Toxoplasmosis.
- Viral - Rubella, CMV, Herpes, HIV, Hepatic viral infections (B, C etc)
- Sexually transmitted infections. (STDs)
- Mother to fetal transmission of infections.
- Identification & management of fetal malpositions and malpresentations. Management of pregnancies complicated by medical, surgical (with other specialties as required) & gynecological diseases.
- Anemia, hematological disorders
- Respiratory, Heart, Renal, Liver, skin diseases.
- Gastro Intestinal, Hypertensive, Autoimmune, Endocrine disorders.
- Associated Surgical Problems.

Acute Abdomen (surgical emergencies - appendicitis & GI emergencies).

Other associated surgical problems.

- Gynecological disorders associated with pregnancy - congenital genital tract developmental anomalies, Gynaec pathologies - fibroid uterus, CaCx, genital prolapse etc.
- Prenatal diagnosis (of fetal problems & abnormalities), treatment - Fetal therapy
- M.T.P, P.N.D.T act et
- National health MCH programs, Social obstetrics and vital statistics
- Recent advances in Obstetrics.

2. Intrapartum care:

- Normal labour - mechanism & management.

- Partographic monitoring of labour progress, recognition of abnormal labour and its appropriate management.
- Identification and conduct of abnormal labour and complicated delivery breech, forceps delivery, caesarian section, destructive operations.
- Induction and augmentation of labour.
- Maternal & fetal monitoring in normal & abnormal labour (including electronic fetal monitoring).
- Identification and management of intrapartum complications, Cord presentation, complication of 3rd stage of labour - retained placenta, inversion of uterus, rupture of uterus, post partum hemorrhage.

3. Post Partum

- Complication of 3rd stage of labour - retained placenta, inversion of uterus, post partum hemorrhage, rupture of uterus, Management of primary & secondary post partum hemorrhage, Retained placenta, uterine inversion. Post-partum collapse, amniotic fluid embolism
- Identification & management of genital tract trauma - perineal tear, cervical/vaginal tear, episiotomy complications, rupture uterus.
- Management of critically ill woman.
- Post partum shock, sepsis & psychosis.
- Post partum contraception.
- Breast feeding practice; counseling & importance of breast-feeding. Problems in breast-feeding and their management, Baby friendly practices.
- Problems of newborn - at birth (resuscitation), management of early neonatal problems.
- Normal and abnormal puerperium - sepsis, thrombophlebitis, mastitis, psychosis. Hematological problems in Obstetrics including coagulation disorders. Use of blood and blood components/products.

OPERATIVE OBSTETRICS: PG students must have performed reasonable routine procedures and assisted / observed uncommon procedures.

- Decision-making, technique & management of complications.
- Vaginal instrumental delivery, Caesarian section, Obst. Hysterectomy, destructive operations, manipulations (External/internal podalic version, manual removal of placenta etc)
- Medical Termination of pregnancy - safe abortion - selection of cases, technique & management of complication, MTP law.

NEWBORN

1. Care of new born: Normal and high risk new born (including NICU care).
2. Asphyxia and neonatal resuscitation.

3. Neonatal sepsis - prevention, detection & management.
4. Neonatal hyper-bilirubinemia - investigation & management.
5. Birth trauma - Detection & management.
6. Detection and management of fetal/neonatal malformation.
7. Management of common neonatal problems.

Paper III

CLINICAL GYNAECOLOGY

- Epidemiology and etiopathogenesis of gynaecological disorders.
- Diagnostic modalities and management of common benign and malignant gynaecological diseases (diseases of genital tract):
 - Fibroid uterus
 - Endometriosis & adenomyosis
 - Endometrial hyperplasia
 - Genital prolaps (uterine & vaginal)
 - Cervical erosion, cervicitis, cervical polyps, cervical neoplasia.
 - Vaginal cysts, vaginal infections, vaginal neoplasia (VIN)
 - Benign Ovarian pathologies
 - Malignant genital neoplasia - of Ovary, Fallopian Tubes, Uterus, Cervix, Vagina, Vulva and Gestational Trophoblastic diseases, Ca Breast.
- Diagnosis and surgical management of clinical conditions related to congenital malformations of genital tract. Reconstructive surgery in gynaecology.
- Intersex, ambiguous sex and chromosomal abnormalities.
- Reproductive endocrinology: Evaluation of Primary / secondary Amenorrhea, management of Hyperprolactenemia, Hirsutism, Chronic an-ovulation, PCOD, thyroid and other endocrine dysfunctions .
- Infertility - Evaluation and management
 - Methods of Ovulation Induction
 - Tubal (Micro) surgery
 - Management of immunological factors of Infertility
 - Male infertility
 - Obesity & other Infertility problems.
 - **(Introductory knowledge of)** Advanced Assisted Reproductive Techniques (ART)
 - Reproductive tract Infections: prevention, diagnosis & treatment.
 - STD
 - HIV
 - Other Infections
 - Genital Tuberculosis.

- Principles of radiotherapy and chemotherapy in gynaecological malignancies. Choice, schedule of administration & complications of such therapies.
- Rational approach in diagnosis and management of endocrinal abnormalities such as: menstrual abnormalities, amenorrhoea (primary/secondary), dysfunctional uterine bleeding, polycystic ovarian disease, hyperprolactinemia (galactorrhea), hyperandrogenism, thyroid - pituitary - adrenal disorders, menopause and its treatment (HRT).
- Urological problems in Gynaecology - Diagnosis and management.
 - Urinary tract infection
 - Urogenital Fistulae
 - Incontinence
 - Other urological problems
- Orthopedic problems in Gynaecology.
- Menopause: management (HRT) and prevention of its complications.
- Endoscopy (Laparoscopy --Hysteroscopy)
 - Diagnostic & simple therapeutic procedures (PG students must be trained to do these procedures)
 - Recent advances in gynaecology - Diagnostic & therapeutic
 - Pediatric, Adolescent & Geriatric Gynaecology
 - Introduction to Advance Operative procedures.

OPERATIVE GYNAECOLOGY

- Abdominal & Vaginal Hysterectomy
- Surgical Procedures for genital prolapse, fibromyoma, endometriosis, ovarian, adenexal, uterine, cervical, vaginal and vulval pathologies.
- Surgical treatment for urinary & other fistulae, Urinary incontinence
- Operative Endoscopy

FAMILY WELFARE & DEMOGRAPHY

- Definition of demography and its importance in Obstetrics and Gynaecology.
- Statistics regarding maternal mortality, perinatal mortality/morbidity, birth rate, fertility rate.
- Organizational and operational aspects of National health policies & programs, in relation to population and family welfare including RCH.
- Various temporary and permanent methods of male and female contraceptive methods.
- Knowledge of contraceptive techniques (including recent developments).
 1. Temporary methods
 2. Permanent Methods.
 3. Recent advances in contraceptive technology

- Provide adequate services to service seekers of contraception including follow up.
- Medical termination of pregnancy: act, its implementation, providing safe and adequate services.
- Demography & population dynamics.
- Contraception (fertility control)

MALE & FEMALE INFERTILITY

- History taking, examination and investigation.
- Causes and management of male infertility.
- Indications, procedures of Assisted Reproductive Techniques in relation to male infertility problems.

PRACTICAL TRAINING

Operative Skills In Obstetrics & Gynaecology

- Adequate proficiency in common Minor & Major operations, post operative management and management of their complications.
- Operative procedures which must be done by P G students during training period: (*in graded D1anner - assisting; Operating with senior person assisting; Operating under supervision*)

(Operations MUST BE DONE / OBSERVED during PG residency & log book maintained)

1. Obstetrics:

Venesection, culdocentesis
Conduct normal deliveries
Episiotomy and its repair
Application of forceps & vacuum (10)
Carry out caesarian section delivery (10 must be one)
Manual removal of placenta
Management of genital tract obstetrical injuries.
Post partum sterilization / Minilap tubal ligation (20 must be done)
Medical termination of pregnancy - various methods (20 must be Done)

2. Gynaecology:

Endometrial / cervical biopsy.
Dilatation & curettage
Culdocentesis, Colpotomy
Opening and closing of abdomen (10 must be done)
Operations for vaginal wall prolapse Ovarian cyst operation
Operation for ectopic pregnancy

Vaginal & abdominal hysterectomy

Operations must be OBSERVED &/OR ASSISTED when possible:

- Internal podalic version
- Caesarean Hysterectomy
- Internal iliac artery ligation
- Destructive obstetrical operations
- Tubal microsurgery
- Radical operations for gynaec malignancies
- Repair of genital fistulae
- Operations for incontinence
- Myomectomy
- Laparoscopic surgery

DIAGNOSTIC PROCEDURES

- Interpretation of x-rays - Twins, common fetal malformations / mal-presentations, abnormal pelvis (pelvimetry), Hysterosalpingigraphy
- Sonographic pictures at various stages of pregnancy - normal and abnormal pregnancies, Fetal biophysical profile, common gynaecological pathologies.
- Amniocentesis
- Fetal surveillance methods - Electronic fetal monitoring and its interpretation
- Post coital test
- Vaginal Pap Smear
- Colposcopy
- Endoscopy - Laparo & Hysteroscopy.

HEALTH OF ADOLESCENT GIRLS AND POST MENOPAUSAL WOMEN

- Recognize importance of good health of adolescent and postmenopausal women.
- Identification and management of health problems of postmenopausal women.
- Understanding and planning and intervention program of social, educational and health needs of adolescent girls & menopausal women.
- Education regarding rights and confidentiality of women's health, specifically related to reproductive function, sexuality, contraception and safe abortion.
- Geriatric problems.

REPRODUCTIVE TRACT AND 'HIV' INFECTION

- Epidemiology of RTI and HIV infection in Indian women of reproductive age group.
- Cause, effect and management of these infections.
- HIV infections in pregnancy, its effects and management.

- Relationship of RTI & HIV with gynaecological disorders.
- Planning and implementation of preventive strategies.

MEDICOLEGAL ASPECTS

- Knowledge and correct application of various acts and laws while practicing obstetrics and gynaecology, particularly MTP act and sterilization, Preconception and P.N.D.T. Act.
- Knowledge of importance of proper recording of facts about history, examination findings, investigation reports and treatment administered in all patients.
- Knowledge of steps recommended for examination and management of rape cases.
- Knowledge of steps taken in the event of death of a patient.

ENVIRONMENT AND HEALTH

- Concept of safe disposal of human body fluids and other materials.
- Universal precautions need to be taken in examination and surgical procedures for the prevention of HIV and other diseases.
- Effect of environment on pregnancy outcome.

O

Syllabus and Curriculum for MS - OPHTHALMOLOGY 2012

The following over all objectives are expected to be achieved by the end of 3 years of instructions and residential training programme. The details are listed subject and clinical assignment wise. At the end of this training programme the students should be able to:

Basic Medical Sciences

- (a) Attain understanding of the structure and function of the eye and its parts In health and disease.
- (b) Attain understanding and application of knowledge of the structure and function of the parts of Central Nervous System and of parts of the body which influence of Control the structure and function of the eye.
- (c) Attain understanding of and develop competence in executing common general laboratory procedures employed in diagnosis and research in ophthalmology.

Clinical Ophthalmology

Given adequate opportunity to work on the basis of graded responsibilities in out-patients, in patients and operation theatres on a rotational basis in the clinical section of the Centre from the day of entry to the completion of the training programme, the students should be able to:

- (a) Acquire scientific and rational approach to the diagnosis of ophthalmic cases presented.
- (b) Acquire understanding of and develop inquisitiveness to investigate, to establish cause and effect of the disease.
- (c) To perform all routine and special ophthalmic investigations (e.g. Slit lamp examination, Gonioscopy, Ophthalmo-dynammonetry, peimetry, scotometry, Tonography, ERG, EOG, EMG, etc., Dark adaptometry, Dark room procedures, Funds photography, Fluorescein angiography, Hess & Less screen Synoptophore and other procedures, of these investigations in the light of clinical presentation.
- (d) To manage and treat all types of ophthalmic cases.

Refraction

- (e) Acquire competence in assessment of refractive errors (Static and dynamic) and prescription of glasses for all types of refraction problem.

- (f) Acquire basic knowledge of manufacture and fittings of glass and competence of judging the accuracy and defects of the dispensed glasses.

Medical & Surgical Management

- (g) To demonstrate the knowledge of the pharmacological (including toxic) aspects of drugs used in ophthalmic practice and drug commonly used in general diseases affecting the eyes.
- (h) To exhibit competence in medical management of ophthalmic cases.
- (i) To competently handle and execute safely all routine surgical procedures on lens, glaucoma, lid, sac, adnexa, retina and muscle anomalies.
- (j) To competently handle all ophthalmic medical and surgical emergencies.
- (k) To be familiar with micro-surgery and special surgical techniques.

Ophthalmic Specialists

Given an opportunity to work on a rotational basis in various especial clinics of Sub-specialties of ophthalmology. The student should be able to:

- (a) Examine, diagnose and demonstrate understanding of management of the problems of Neuro-ophthalmology and refer appropriate cases to Neurology and Neuro-Surgery.
- (b) To examine, diagnose and demonstrate understanding of management of (medical and surgical)complicated problems in the field of
- (a) lens, (b) Uvea, (c) Cornea including of transplant and implant (d) Retina including ratalinal detachment (e) Squint (f) Ophthalmoplasty and tumours of Eye (g) Glaucoma (h) Plastic Surgery of Eye and (i) Genetic Problems in Ophthalmology.
- (c) To demonstrate understanding of the manufacture, and competence in prescription and dispensing of contact lenses and ocular prosthesis.

Ophthalmic Pathological Science

- (a) Given the relevant clinical operative and radiological data the student should be able to identify and describe the major histomorphology alternations in the tissues received in the section of ocular pathology.
- (b) Be able to interpret the diagnosis in correlation with the clinical data of routine materials received in at least 80 % of the cases.
- (c) Be able to demonstrate an understanding of the histogenic and Patho physiologic processes associated with such lesions.

Community Ophthalmology

Given an opportunity to participate in surveys, eye camps and Rehabilitation teams, the students should be able to:

- (a) Organize & conduct surgeries in rural, urban and industrial communities and in specialized groups of population.

- (b) Organize & conduct comprehensive eye camps covering promotive, Rehabilitative and curative aspects of ophthalmic problems.
- (c) Guide rehabilitation workers in the organization and training of the blinds in art of daily living and in the vocational training of the blind leading to gainful employment.

Research

- (a) Recognize a research problem.
- (b) State the objective in terms of what is expected to be achieved in the end.
- (c) Plan a rational approach with appropriate controls with full awareness of the statistical validity of the size of the material.
- (d) Spell out the methodology and carry out most of the technical procedures required for the study.
- (e) Accurately and objectively record on systematic lines the result and observation made.
- (f) Analyze the data with the aid of an appropriate statistical analysis.
- (g) Interpret the observations in the light of existing knowledge and highlight in what ways the study has advanced existing knowledge on the object and what further remains.
- (h) Write a thesis in accordance with the prescribed instructions (Appendix III).
- (i) Write at least one scientific paper as expected of International Standards from the material of his thesis.

Teaching

- (a) To write symposiums and critically discuss them
- (b) To methodically summarize internationally published articles according to prescribed instructions and critically evaluate and discuss each selected article.
- (c) To discuss symposia and journals with his colleagues and guide his juniors in groups.
- (d) To present case at clinical conferences discuss them with his colleagues and Guide his juniors in groups in evaluation & discussion of these cases.

Courses

The training programmes in the Centre are divided into theoretical, clinical and practical in all aspects of the delivery of the Ophthalmic medical and health care. They provide training in methodology of research and teaching. The course runs for a period of three years on a residency pattern.

At the end of the prescribed period the students may submit a thesis on a research problem that may have been identified earlier and at the end of the prescribed period appears for the final examination lasting for 3 days depending upon the numbers of candidates, the actual questioning time per candidate being not less than 3 hours.

THEORETICAL

The theoretical knowledge is imparted to the candidate through distinct courses of lecture demonstration and symposia. The students are exposed to recent advances through discussions in journal clubs Symposia.

These are considered necessary in view of the inadequate exposure to ophthalmology in the undergraduate curriculum. A record of association's library and any students is free to consult them whenever he desires.

DIDACTIC TEACHING IN CLINICAL APPLIED BASIS AND PARA-CLINICAL SCIENCES

- (a) Knowledge in applied, basic and para clinical and clinical science is imparted by the member of the staff of the Centre in respective disciplines or by clinicians themselves by conducting didactic courses-(Lecture & Demonstration)
- (b) Symposia In each section which has two or more specialties the residents of 3rd and 4th semester are exposed to 14 symposia in each specialty over a 1 year period to cover the entire specialty.
- (c) Journal Clubs Journals are reviewed in a particular specialty covering all articles in that subject over a 6 months period and 10 major articles presented and discussed by the resident. About 2 journal reviews per section are done every 3 months.
 - 1) Aim 2) Methods 3) Observations
 - 4) Discussions and 5) Conclusions

CAMPS

Eye camps are conducted where residents are posted for imparting training to the clinical residents according to a set methodology. The community and school surveys are conducted by residents.

TEACHING

The residents are imparted training in teaching in several ways.

- a) Group Discussions :-The residents are divided in six groups. Each group is composed of a resident from each semester. In the group the following exercises are discussed. The senior group leadership and gain experience in teaching . The IV semester act as deputy leaders.
- b) Symposia :-The residents present the Symposium to the group where it is fully discussed. The first semester residents are required to show that they have read the topic from the literature besides the cyclostyled copy supplied to them on which they are questioned by the group leader. The leader or deputy group leaders help the other resident by offering clarifications, criticism and pointing out the deficiencies in written up material. A free and fair discussion is encouraged. These discussions enable the residents to prepare for a general discussion in the class.
- c) Journal Clubs :-The resident to whom the journal is allotted present the journal summaries (as cyclostyled and distributed) to the group where ;each article is fully discussed. They are expected to show their understanding of the aspect covered in the article and on which the other residents are questioned by the group leader and the deputy group leader clarify any of the points raised in the article, offer criticisms

and evaluate the article in the light of known literature. These discussion enable the residents to prepare for a general discussion in the class.

- d) Case discussion conference :-The residents present the case allotted to the group and discussion the case in the group and in the class. A free & unfettered discussion is encouraged.

TEACHING PROGRAMME FOR 1ST AND IIND SEMESTER JUNIOR RESIDENT

SYLLABUS

Paper I: Applied Basic Sciences in Ophthalmology

I. ANATOMY AND PHYSIOLOGY

- a) Anatomy of the eye and ocular adnexa
- b) Embryology of the eye and adnexa
- c) The visual pathways
- d) Anatomy and Physiology of motor mechanisms
- e) Physiology of vision, colour vision, accommodation
- f) Binocular vision and its development
- g) Maintenance of intra ocular pressure
- h) The Neurology of vision (Visual pathway, papillary pathways and reaction) dark adaptation.
- i) Optics – elementary Physiological optics, optics of retinoscopy and other dark room procedures and ophthalmic equipments.
- j) Physiology of aqueous humour and its circulation and maintenance of intraocular pressure.
- k) Maintenance of corneal transparency.
- l) Tear circulation
- m) Blood aqueous barrier.

II. PATHOLOGY AND MICROBIOLOGY

- a) Pathology of ocular and adnexal lesions (Inflammatory, neoplastic, lens specification etc)
- b) Microbiology of common organism affecting the eye – Bacteria Staph. Strepto – pneumococci, gonococci diphtheria, Morax axenfield bacillus, AFB, Lepra bacilli, pseudomonas etc
- c) Virus – Herpes Zoster, Simplex, adenovirus, trachoma, HIV etc.
- d) Parasites, protozoa and fungi causing ocular lesion e.g., toxoplasma amoebiasis, toxocariasis, treponema, cysticercus, hydatid, microfilaria aspergillus, penicillium, candida etc.

III. BIOCHEMISTRY

- a) Vitamin A and its metabolism
- b) Glucose metabolism 257
- c) Aqueous composition

- d) Biochemical aspects of cataract (Senile and diabetic)
- e) Thyroid function tests
- f) Tear film and its composition.

IV. PHARMACOLOGY

Pharmacology of drugs used in Ophthalmology

- a) Autonomic drugs – Sympathomimetic, Sympatholytics, cholinergic, Anticholinergic agents etc.,
- b) Antibiotics and chemotherapeutic agents used in ophthalmology
- c) Anti-inflammatory agent – steroid and non-steroidal agents
- d) Anti virals and antifungals used in ophthalmology
- e) Local anaesthetics
- f) Dyes used in ophthalmology – fluorescein, rose Bengal etc.
- g) Tear Substitutes
- h) Drugs used to reduce intra ocular pressure (systemic and topical agents)
- i) Ocular penetration of systemically administered drugs and topical agents.
- j) Anti-mitotic agents and immunosuppressives

V. OPTICS

S.NO. SUBJECT

1. Verification of lens/Contact Lenses.
2. Calculation of IOL power.
3. Contact lenses in ophthalmology –types and indications.
4. Lab. Diagnosis of bacterial infection.
5. Lab. Diagnosis of fungal & viral infections.
6. Eye medication including making of eye drops.
7. Preservative media.
8. Histopathology of ocular & orbital tissue with special reference to collection of material.
9. Lab. Techniques in Pathology.
- 10 Collection of blood samples in various tests.
11. Orbital & para-orbital radiology.
12. Radiology in reference to Neuro Ophthalmology.
13. Local anesthetics & their toxicity & management.
14. C.P.R.
15. Immune response in eye.
16. Ophthalmic microscopes & techniques in micro surgery.
17. Microsurgical instruments (corneal transplant, R.K., IOL etc.
18. Vitrectomy, cryosurgical & diathermy instruments.
19. Argon laser & its application in anterior segment.
20. YAG Laser & its application in anterior & posterior.
21. Minor O.T. procedure- F.R. removal, suture removal and management of ocular trauma.
22. How to tackle ocular emergencies.
23. Medico legal aspects in Eye Casualty.

24. O. T. Care, sterilization, no touch technique.
25. Eye Bank, set up, equipment, work methodology.
26. Enucleation procedure, grading eyes, preservation.
27. Photography in Ophthalmology.
28. Procedures in Experimental operation theater.
29. National plan for control of blindness.
30. Fluorescent Angiography.
31. U. S. G.
32. Electrophysiology ERG, VER, EOG.
33. Community Services – Eye Camps, needs scope & minimum standards.

LECTURE DEMONSTRATIONS FOR IST AND IIND SEMESTER JR. RESEIDENTS,

S.NO. SUBJECT

1. Retinoscopy and Cycloplegice, PMT including selection of spectacles.
2. Direct & Indirect ophthalmoscopy & Goldmann 3 mirror examination of funds & vitreous.
3. Slit lamp biomicroscopy-Anterior Segment.
4. Tonometry.
5. Gnioscopy.
6. Field Charging.
7. Evaluation of Iecrimal pathways & tear film evaluation.
8. Corneal topography, pachymetry, specular microscopy.
9. Covertest, PBCT, Ocular movements Maddex Red/Wing, Stereopsis.
10. Synoptophore examination, diplopia chart, Less Screen, binocular Uniocular, field of fixation.
11. Pleoptics.
12. Macular function tests.
13. Visual assessment in children & infants.
14. Radiology of orbit & skull Part-I.
15. Radiology of orbit & skull Part-II.
16. A holistic concepts of eye disease.
17. Epidemiological concepts and techniques, investigation of an epidemic.
18. Epidemiological indicates and methodology for investigation of an epidemic.
19. Non Communicable ocular diseases and Nutritional disorders.
20. Industrial Ophthalmology.
21. Communicable ocular condition.
22. Survey Designs, Health Information system and role of computer.
23. Graphical representation of data and its interpretation.
24. Principles and practice of eye health education.
25. Existing eye health infrastructure and the national programme for control of blindness.
26. Eye Camp approach for management of ocular morbidity.

27. Role of other national programmes for decreasing ocular morbidity and programmes for visual rehabilitation.
28. Eye Health Planning and Management.
29. Financial and human resource development for ocular health care.
30. Formulation, implementation and evaluation of community directed porogramme.

LIST OF THE SYMPOSIA

Section-I

1. Basics of Vitreo Retina
 - a) Anatomy and Physiology of Retina.
 - b) Anatomy and Physiology of Vitreous.
 - c) Vitreo Retina Precursrs of Retinal detachment.
2. Retinal detachment surgery
 - a) Evaluation of R. D. Surgery.
 - b) Conventional R. D. Surgery.
 - c) Complications of R. D. Surgery.
3. Exudative retinal detachment
 - (a) Aetiology and immunological concepts.
 - (b) Clinical picture and investigations.
 - (c) Management.
4. Advances in Proliferative vitreo-retinopathy
 - (a) Classification and investigations
 - (b) Surgical techniques in PVR
 - (c) Medical Management.
5. Endophthalmitis
 - (a) Classification and clinical picture
 - (b) Advances with special reference to smear culture and media.
 - (c) Intra-vitreous antibiotic & vitrectomy.
6. Vitreous Substitues
 - (a) Air and gases.
 - (b) Silicone oil and fluoro silicone oil.
 - (c) Perfluorocarbene liquide & recent advances.
7. Lasers & posterior segment diseases
 - (a) Pre-laser work up
 - (b) Different type of lasers and delivery systems
 - (c) Indications, complications and follow up.

MEDICAL OPHTHALMOLOGY

1. Fluorescein Angiography.
 - (a) Principles, Equipment & indications
 - (b) Preparation of patient, dyes used and procedure side effect of FA : F-Scopy.

(c) Specialized FA procedures including Oral FA, Low dose FA and anterior segment angiography.

2. Hypertensive Retinopathy

- (a) Aetiopathogenesis & classification
- (b) Clinical picture, investigations and complications
- (c) Management.

3. Dysthyroid Ophthalmology

- (a) Clinical picture & classifications
- (b) Aetiopathogenesis with special reference to immunological concepts.
- (c) Investigations & Management.

4. Parasitic Infestations of the eye & Adnexa

- (a) Ocular Cysti-cercosis : Epidemiology, Life Cycle and presentations.
- (b) Diagnosis & Management of Ocular cysticercosis
- (c) Hydatid cyst. Ocular Myiasis and other ocular parasitic infestations.

5. Diabetic Retinopathy

- (a) Classification with clinical picture
- (b) Medical Management including laser.
- (c) Hydatid cyst. Ocular Myiasis and other ocular parasitic infestations.

6. Retinal Degeneration

- (a) Heredomacular degeneration.
- (b) Retinitis pigmentosa and its variants.
- (c) Flacked Retine syndrome.

7. Macular lesions

- (a) CSR.
- (b) ARMD.
- (c) Marula hole.

UVEA

1. Anterior Uveitis

- (a) Aetiology and classification
- (b) Clinical work up
- (c) Treatment

2. Posterior Uveitis

- (a) Clinical picture
- (b) Treatment & role of Immunosuppesors.
- (c) New entities.

3. Basic Principles of Relevance

- (a) Anatomy of the uveal tract
- (b) Element of the immune system
- (c) Concepts of disease pathogenesis.

4. Endopthalmitis : A Practical approach

- (a) Clinical features

- (b) Differential diagnosis & investigations
- (c) Principles of Management.
- 5. Specific infective Uveitic entities.
 - (a) Fungal diseases.
 - (b) Viral infections including AID
 - (c) Parasitic infections.
- 6. Specific uveitis entities.
 - (a) Tuberculosis.
 - (b) Leprosy.
 - (c) Syphilis.
- 7. Principles of Management of Uveitis and its complications
 - (a) Investigations.
 - (b) Medical Therapy
 - (c) Surgical Therapy

SECTION-II

- 1. Advances in Vitreous Surgery
 - (a) Instrumentation
 - (b) Indications
 - (c) Techniques
- 2. Basic of Vitreous Surgery
 - (a) Instrumentation.
 - (b) Indications for medical/surgical intervention
 - (c) Management and complications.
- 6. Vitreo-retinal Surgery in RD
 - (a) Indications
 - (b) Techniques
 - (c) Advances in management
- 7. Vitreous surgery in Posterior Segment Ocular Trauma
 - (a) Indications.
 - (b) Techniques.
 - (c) Management of posterior segment IOFB
- 8. Anterior Segment Trauma
 - (a) Cornea.
 - (b) Iris trauma, hyphaema & glaucoma.
 - (c) Lens injuries.
- 9. Chemical injuries
 - (a) Etiology & Pathology of acid & alkali burns
 - (b) Clinical features of Acid & Alkali Burns.
 - (c) Management of Acid of Alkali Burns.
- 10. Posterior Segment Trauma
 - (a) Pathophysiology.

- (b) Traumatic retinal Tears & detachment.
- (c) Traumatic maculopathies.
- 11. Intra ocular foreign bodies.
 - (a) Diagnosis and localization
 - (b) Siderosis and chalocosis.
 - (c) Management.
- 12. Orbital Fractures
 - (a) Classification
 - (b) Examination & evaluation
 - (c) Management.
- 13. Traumatic Endophthalmitis
 - (a) Actiology and clinical picture.
 - (b) Diagnosis
 - (c) Management
- 14. Important consideration in Trauma
 - (a) Epidemiology.
 - (b) Prevention
 - (c) Medico legal consideration.
 - (d) Techniques
 - (e) Complications
- 3. Cystoid macula oedema.
 - (a) Aetiology.
 - (b) Management
 - (c) Role of Vitreous Surgery.
- 4. Vit. Hemorrhage
 - (a) Causes
 - (b) Indications of Viterctomy
 - (c) Techniques, results & complications.
- 5. Vitreous Surgery in ROP
 - (a) Aetiology, classification and clinical picture.

SECTION-III

- 1. Donor Corneal Tissue
 - (a) Legal Aspects Collection and Processing of Donor Tissue.
 - (b) Evaluation of Donor Corneal Tissue.
 - (c) Preservation Techniques.
- 2. Penetrating Keratoplasty-Surgical Techniques
 - (a) Cutting of Host Cornea.
 - (b) Cutting of Donor Cornea.
 - (c) Suturing Techniques.
- 3. Corneal Graft Rejection
 - (a) Human Immune System and Immunopathology of Graft Rejection.

- (b) Risk Factors and Clinical Picture of Graft Rejection.
- (c) Management of Graft Rejection.
- 4. Conjunctivitis
 - (a) Bacterial Conjunctivitis and Ophthalmia Neonatorum
 - (b) Viral Conjunctivitis
 - (c) Allergic Conjunctivitis
- 5. Tear Film-Abnormalities and Management
 - (a) Physiology of Tear Film and Tear Pump
 - (b) Abnormalities in Tear Film and their Diagnosis
 - (c) Management of Tear Film Abnormalities.
- 6. Dry Eye & Keratomalacia
 - (a) Aetiopathogenesis of xerosis, Keratomalacia and its management.
 - (b) Dry eye syndrome and its medical management
 - (c) Surgical management of Dry eye.
- 7. Cataract
 - (a) Anatomy & Embryology
 - (b) Physio Pathology.
 - (c) Pathogenesis of age related cataract.
- 8. Congenital Cataract
 - (a) Aetiology.
 - (b) Types
 - (c) Management.
- 9. Acquired Cataract
 - (a) Complicated cataract.
 - (b) Traumatic Cataract
 - (c) Other Types.
- 10. IOLS
 - (a) History, Physical and Chemical Properties & Types
 - (b) Techniques of IOL Implantation.
 - (c) Complications related to IOL
- 11. Trachoma
 - (a) Immunology, Structure & Pathology & Classification
 - (b) Clinical picture, sequelae and complications.
 - (c) Control & Treatment.
- 12. Bacterial Keratitis
 - (a) Aetiopathology Lab. Diagnosis.
 - (b) Clinical Picture.
 - (c) Medical and Surgical management.
- 13. Viral Keratitis
 - (a) Aetiopathology & Lab. Diagnosis.
 - (b) Clinical Picture.

- (c) Medical & Surgical management.
- 14. Fungal Keratitis
 - (a) Pathogenesis
 - (b) Clinical Picture
 - (c) Management.
- 15. Nonieffective corneal ulcers/corneal Degeneration
 - (a) Morren's Unler.
 - (b) Terrain's And Pellucid Degeneration.
 - (c) Other Causes of non-ineffective corneal ulcers.
- 16. Corneal Dystrophies
 - (a) Epithelial
 - (b) Stromal
 - (c) Endothelial
- 17. Ectatic Corneal Dystrophies
 - (a) Keratoconus
 - (b) Keratoglobus
 - (c) Management
- 18. Phacoemulsification Surgery
 - (a) Equipment and Instruments and their Principles.
 - (b) Wound Construction and Closure.
 - (c) Nucleus Management and Cortical Clean UP.
- 19. Secondary IOL Implantation
 - (a) Indications
 - (b) Choice of IOL and Techniques
 - (c) Complications and Problems
- 20. The Capsule in Cataract Surgery
 - (a) Clinical picture of after cataracts
 - (b) Management of Secondary Pupillary membrane in Aphakia
 - (c) Posterior capsular Dialysis in Cataract Surgery.
- 21. Subluxation/Dislocation of Lens
 - (a) Aetiopathogenesis
 - (b) Clinical Picture
 - (c) Management

SECTION-IV

- 1. Contact Lens and LOW VISION AIDS
 - (a) Physiology
 - (b) Indications/contraindications
 - (c) Fitting philosophies (Hard lens)
- 2. Contact Lens
 - (a) Material and care system

- (b) C.L. related ocular complications
- (c) Corneal complications including infective Keratitis
- 3. Soft contact lenses
 - (a) Characteristics, advantages and disadvantages.
 - (b) Verification of lenses and fitting methods.
 - (c) Care system and complication.
- 4. RGP lenses
 - (a) Materials and characteristics
 - (b) Fitting problems and their solution.
 - (c) Complications
- 5. Special fitting situation in
 - (a) Keratoconus and post R.K.
 - (b) Astigmatism, presbyopia
 - (c) Disposable contact lens
- 6. Contact lens
 - (a) Extended wear contact lens
 - (b) Therapeutic contact lens
 - (c) Disposable contact lens
- 7. Low Vision Aids (LVA)
 - (a) Definition of low vision and initial examination.
 - (b) Optics of LVA and classification
 - (c) Prescription of PVA & rehabilitation.Symposium - Refractive Keratoplasty.
- 8. Surgery for myopia (R. K.)
 - (a) History of R.K.
 - (b) Medicolegal aspect
 - (c) Preoperative evaluation.
- 9. Radial Keratotomy
 - (a) Predictability in RK and factors
 - (b) Operative technique and instrumentations.
 - (c) Complications and results.
- 10. Myopia Surgery
 - (a) Scleroplasty and others
 - (b) Epikeratophakia/keratomeluisis/intracornea lenses.
 - (c) Clear lens extraction and phakic AC IOLs.
- 11. Lasers for Myopia Surgery.
 - (a) Laser in corneal surgery and characteristics
 - (b) Wound healing after laser keratotomy.
 - (c) P.R.K.
- 12. Surgical Management of Astigmatism
 - (a) Terminology & definition, optical & surgical principles

- (b) Detection and measurement of astigmatism
- (c) Surgical monograms
- 13. Surgeries of Astigmatism.
 - (a) Weakening procedures
 - (b) Strengthening procedures
 - (c) P.R.K.
- 14. Surgical management of
 - (a) Post R.K. Astigmatism
 - (b) Pathology and management of post R.K.astigmatism
 - (c) Surgical management of post cataract astigmatism.

GLAUCOMA

- 15. Diagnosis of glaucoma I
 - (a) Tonometry types, standardization, use
 - (b) Gonioscopes
 - (c) Surgical nerve head and nerve fibre layer evaluation.
- 16. Diagnosis of glaucoma II
 - (a) Basics of Perimetry
 - (b) Comparison of Goldmann's automated
 - (c) Newer Tests for glaucoma
- 17. Primary Angle closure glaucoma
 - (a) Epidemiology
 - (b) Diagnostic features.
 - (c) Management.
- 18. Primary open angle glaucoma.
 - (a) Ocular hypertension
 - (b) Low tension glaucoma
 - (c) Management.
- 19. Congenital glaucoma
 - (a) Types and associations
 - (b) Clinical features
 - (c) Management.
- 20. Lasers in glaucoma
 - (a) Iridotomy
 - (b) Argon laser trabeculoplasty
 - (c) Other procedures.
- 21. Medical management of glaucoma
 - (a) Pilocarpine
 - (b) Beta blockers
 - (c) Hyperosmotic agents.

SECTION- V

Pediatric Ophthalmology

1. Basic concepts of genetics, heredity & congenital malformations.
 - (a) Anatomical & Physiological consideration of inheritance
 - (b) Laws of inheritance
 - (c) Natural basis of congenital malformation
2. Eye in infancy
 - (a) Anatomical & physiological considerations
 - (b) Development of vision and its assessment
 - (c) Ophthalmic evaluation of children.
3. Genetically determined metabolic disorders in children.
 - (a) Protein
 - (b) Fat
 - (c) Carbohydrate & others
4. Leucocoria
 - (a) Aetiology & classification
 - (b) Diagnosis and investigations
 - (c) Management
5. Management of epiphora
 - (a) Causes
 - (b) Medical management
 - (c) Surgical management
6. Management of congenital cataract
 - (a) Aetiology
 - (b) Investigations
 - (c) Plan of management
7. Eye in neurological disorders in children
 - (a) Congenital including cranial facial malformations
 - (b) Inflammation
 - (c) Orchers

OPHTHALMOPLASTY

8. Congenital ptosis
 - (a) Anatomy of LPS & principles of ptosis surgery.
 - (b) Surgical procedures
 - (c) Complications of ptosis surgery
9. Lid reconstruction
 - (a) Anatomy & basic requirements
 - (b) Small and large defects
 - (c) Defects on medical side
10. Contracted socket
 - (a) Etiopathogenesis & principles of management
 - (b) Closed methods of repair conjunctival & skin grafting
 - (c) Dermis fat graft.

11. Lacrimal System
 - (a) Anatomy of drainage system & investigative procedures
 - (b) Per 7 days
 - (c) CDCR & other intubation techniques
12. Retinoblastoma
 - (a) Clinical examination and diagnosis
 - (b) Surgical treatment
 - (c) Radiotherapy
13. Orbital diseases
 - (a) Proptosis- clinical exam. & common causes
 - (b) Orbital cellulitis
 - (c) Orbit in leukaemia
14. Orbital Surgery
 - (a) Anatomy of orbit & S.O.F.
 - (b) Anesthesia & instrumentation with anterior orbitotomy
 - (c) Lateral Orbitotomy.

SECTION – VI

Neuro Ophthalmology

1. Papilledema
 - (a) Etiopathogenesis
 - (b) Clinical picture
 - (c) Differential diagnosis
2. Optic neuritis
 - (a) Clinical picture
 - (b) Visual prognosis
 - (c) Treatment
3. Space occupying lesions of sellar region
 - (a) Intrasellar tumors
 - (b) Supra sellar tumors
 - (c) Parasellar tumors
4. Myopathics & disorders of neuromuscular transmission
 - (a) Ocular myopathies
 - (b) Myasthenia-clinical picture & diagnosis
 - (c) Myasthenia- management
5. Defects of ocular motility
 - (a) Neural control of ocular movements
 - (b) Examination of ocular motility-Principles & Techniques
 - (c) Topical diagnosis of supra nucleus disorders.
6. Nystagmus
 - (a) Definition & classification

- (b) Physiological & Induced nystagmus
- (c) Pathological nystagmus & topical diagnosis
- 7. Intracranial aneurysms
 - (a) Clinical picture
 - (b) Diagnosis
 - (c) Management

Strabismus

- 8. Binocular vision
 - (a) Fusion, correspondence, diploma
 - (b) Stereopsis & monocular clue
 - (c) Theories of Binocular Vision
- 9. Amblyopia
 - (a) Classification, pathogenesis
 - (b) Clinical features
 - (c) Management
- 10. Paralytic squint
 - (a) Clinical features
 - (b) Investigations
 - (c) Management
- 11. Esodeviation
 - (a) Aetiology & classification
 - (b) Accommodative esotropia
 - (c) Congenital esotropia, microtropia
- 12. Exodeviations
 - (a) Classification, clinical feature
 - (b) Convergence insufficiency & intermittent divergent squint
 - (c) Secondary deviations.
- 13. A-V Patterns
 - (a) Etiology, classification
 - (b) Clinical features, investigations
 - (c) Management
- 14. Special forms of strabismus
 - (a) Duane's retraction syndrome
 - (b) Other restrictive squint
 - (c) Myasthenia and Myopathies.

OPERATIONS FOR POSTGRADUATES

- | | |
|-------------------------------|------------------------------|
| Should be able to do | Familiar with (Assisting in) |
| Lids | |
| - Entropion different methods | - Ptosis |
| - Ectropion (uncomplicated) | - Lid repair |

- Electrolysis
- Tarsorrhaphy
- Chalazion Sac
- Dacryocystectomy
- Dacryocystorhinostomy
- Fistula repair
- Complicated sac Surgery

Muscle

- a) Horizontal Muscle Surgery
- i) Recession
- ii) Resection
- iii) Other Shortening & Lengthening process
- Vertical Recti and oblique muscle surgery
- Faden
- Adjustable
- Transplantation of muscles

Cornea and Conjunctive

- Cyst removal
- Carbolicisation
- Tattooing
- Conjunctival flap
- Pterygium
- Paracentesis
- Keratoplasty
 - a) Lamellar
 - b) Penetrating
 - c) Therapeutic
 - d) Cystoid Debris
 - e) Radial Keratotomy
 - f) LASIK

Lens

- Cataract surgery by various methods
- Intracapsular extraction
- Extracapsular extraction
- Phaco (small incision Cataract surgery)
- Combined operation for Glaucoma & Cataract
- Surgery on subluxated lens

- I.O.L.

Iris and ciliary body & glaucoma

- Yag laser Iridotomies
- Trabeculectomy
- Cyclodestructive procedures
- Optical iridectomy
- Microsurgery for glaucoma like goniotomy
- Laser trabeculotomy ect.
- Glaucoma Seton Operation

Retina & Vitreous

- Peritomy
- Vitreous biopsy
- Intravitreal Injection
- Detachment
- Photocoagulation/Laser
- Removal of retinal cyst
- Vitreous surgery
- Vitreoretinal surgery

Orbit and globe

- Enucleation with and without implants
- Orbitotomies

- Evisceration
- Exenteration
- Injuries
- Repair of wounds
- Removal of Intra ocular foreign bodies
- Removal of extra ocular Ocular foreign bodies
- Handling of operating – Microscopy

Assessment:-

General Principles

- The assessment should be valid, objective, and reliable.
- It must cover cognitive, psychomotor and affective domains.
- Formative, continuing and summative (final) assessment should be conducted in theory as well as practicals/clinicals. In addition, thesis should be assessed separately.

Overall Weightage

- Internal assessment - 20%
- Final summative examination - 80%

Formative assessment

The formative assessment should be continuous as well as end-of-term. The former should be based on the feedback from the senior residents and the unit faculty concerned. End-of-term assessment should be held at the end of each semester (upto the 5th semester). Formative assessment will not count towards pass/fail at the end of the program, but will provide feedback to the candidate. Scheme of internal assessment examination It is held by means of a written test and practical (and or clinical) with viva examination by all consultants of the department as per distribution of marks as follows. In such five six monthly tests a candidate shall be evaluated for 1000 marks in total i.e. 200 marks in each term as follows.

Item	1st term	2nd term	3rd term	4th term	5th term
Theory	75 marks	75 marks	75 marks	75 marks	75 marks
Oral, Practical/clinical	75 marks	75 marks	75 marks	75 marks	75 marks
Log book evaluation	50 marks	50 marks	50 marks	50 marks	50 marks
Total	200 marks	200 marks	200 marks	200 marks	200 marks
Gross total	1000 marks				
Carried forward to Final MD/MS Examination	20 % marks ~ 200 marks				

200 marks shall be carried over a period of five terms as follows.

- Log book evaluation- 10 x 5terms= 50 marks
- Theory exam 15 x 5terms= 75 marks
- Oral ,Practical/Clinical exam 15 x 5terms= 75 marks

Evaluation of the Log book:

Each candidate should be required to maintain a log book in which following details will be entered and evaluated on a scale of 1 to 10. At end of each term of 6months of training for 5such terms the logbook will be evaluated and a score is to be calculated out from a maximum of 100 marks for the 10 items as entered in the logbook.

- i. skills learned independently, under supervision or assisted by him. 1 to 10
- ii. Presentations in journal clubs1 to 10.
- iii. Cases presented in clinical meetings 1 to 10
- iv. Presentation in departmental seminars..... 1 to 10
- v. Intra and interdepartmental training and evaluation details.....1 to 10
- vi. Teaching activities.....1 to 10
- vii. Conferences/workshops/CME attended 1 to 10
- viii. Papers presented/published conferences.....1 to 10
- ix. Didactic lectures attended.....1 to 10
- x. Thesis progress and evaluation details.....1 to 10

MD Examination:

Pattern of question for theory Papers- There shall be four theory papers. One paper out of these shall be on ‘Basic Medical Sciences’ and one paper on ‘Recent Advances’ in the discipline. There shall be 100 marks for each paper to be answered in 3 hours’ time. There shall be ‘1 structured essay type question’ for 20 marks besides 8‘short essay type questions’ for 10 marks each in each paper.

Days of practical examination-Practical Examination should be conducted for a batch of upto 8 candidates over a minimum period of two to three days extendable up to 7days subject to the subject curriculum with due approval of the board of examiners. For a batch of more than 8 the examination may extend accordingly. The theory papers shall be evaluated at the examination center itself before commencement of the practical/clinical and oral examination in the subject during these practical examination days.

Components of examination-It consist of a written examination, a practical examination to assess the clinical/practical competencies and skills, and a viva voce examination.

The examinations shall consist of A) theory

B) practical including clinical

C) oral

A.Theory-

The 4 papers in theory shall be conducted well in advance before the oral , clinical/practical examination.

B. Practical

Clinical/Practical examination is the most important part of the evaluation and is aimed at assessing the clinical/practical skills of the candidate and diagnostic reasoning. Entirely objective evaluation of these skills is neither feasible nor desirable. However, in order to test the various skills, the examiners may evaluate the candidates on a structured format.

C. Pedagogic Skill

The candidate shall be allotted a topic from the discipline at a short notice of few hours, (preferably on the first day of the examination) to prepare and present before the board of examiners within a time span of 15 minutes (preferably on the second day of the examinations) . The teaching skill will be evaluated under various points(as illustrated below) and marks given accordingly.

- (i) Choice of article/topic (unless specifically allotted)
- (ii) Completeness of presentation
- (iii) Clarity of presentation
- (iv) Understanding of the subject and ability to convey the same
- (v) Whether relevant references have been consulted
- (vi) Ability to convey points in favour and against the subject under discussion
- (vii) Use of audio-visual aids
- (viii) Ability to answer questions
- (ix) Time scheduling
- (x) Overall performance

D. Viva-Voce

a.Viva-voce is expected to be conducted at every stage of the practical examination. The resident will be required to answer oral questions on any aspect of the specialty. Oral examination is designed to test the general scientific background of the candidate and his/her own particular contribution embodied by the thesis. A formal "grand viva-voce" may be held at the end of the practical examination. Questions on the thesis/dissertation may be asked at this time as well. The board of examiners will conduct the examination. They will read out the comments & questions and will seek the answers from the candidate. The viva voce should be assessed under the following headings:

1. Thesis viva voce
2. Grand viva voce

All examiners shall be jointly responsible for all parts of the examination. In presence of the external examiners, the Chairman of the conducting board shall make the necessary arrangements for conducting the oral and practical including clinical examination at the department in the college centre .

b. The candidate shall bring the logbook and a copy of his/her thesis mandatorily while appearing for the oral, practical and clinical examination.

Marks for examinations: The examinations shall be organized on the basis of marking system to evaluate and certify candidate's level of knowledge, skill and competence as per distributions mentioned below. In total the overall assessment for a postgraduate shall be for 1000 marks distributed as follows.

A.Internal assessment exam(200 marks)

- Theory 15x5=75
- Practical (Oral, clinical and practical) 15x5=75
- Log book evaluation 10x5=50
- Total : 40x5=200

B.Final MD/MS exam (800 marks)

- Theory (100 x 4 Papers) 400
- Oral ,Clinical/Practical 400
- l)Clinical/Practical (300 marks)
 - Long exercise (one) 80 marks
 - Short exercise (three) 120 marks
 - OSPE(ten) 40 marks
 - Spots(ten) 40 marks
 - Pedagogic skill 20 marks

II) Viva		(100 marks)
Thesis Viva		20 marks
Grand Viva		80 marks
Grand Total	(A+B)=	1000 marks

PASS/FAIL- In order to pass the examination in each subject a candidate must secure not less than 50% marks in each head of passing which shall include (1) Theory (2) Practical including clinical and viva voce examination (3) internal assessment examination.

Plan of MD/MS Examination:-

The PG examination shall be carried out in three parts:-

Theory :-

- There shall be 4 papers with 100 marks for 3hours duration of examination each.
- There shall be 2 structured essay type questions for 15 marks each along with 7 short answer type questions for 10 marks each in each paper.
- The chapter distribution for the papers shall be as follows.
- Papers-

paper-I : basic science related to ophthalmology.

paper-II : clinical ophthalmology.

paper-III : principles and practice of ocular surgery.

paper-IV : community ophthalmology ,recent advances.

SCHEME FOR CLINICAL AND ORAL EXAMINATION

1. Clinical examination: It will consist of one long case, two short cases, 2 fundus examination, one case for refraction.
2. Oral: It will consist of examination of one histopathology slide, one microbiology slide, pathology specimen, x-rays and charts – field defects, diplopia charting,instruments and general viva.

Model Questions:-

M.S OPHTHALMOLOGY

PAPER I (APPLIED BASIC SCIENCES IN OPHTHALMOLOGY)

Time: 3 Hours

Marks: 100

Write short Notes on:

(10 X 10= 100)

- a) Describe the ocular and orbital venous drainage.
- b) Describe the factors responsible for corneal transparency
- c) Describe the aqueous outflow pathways discuss the pathophysiology of primary open angle glaucoma.
- d) Physiological basis of night vision

- e) Describe the neural pathways responsible for direct and consensual reflex
- f) Steroid pulse Therapy
- g) Indocyanin Angiography
- h) Rhinosporadiosis
- i) Prisms in Ophthalmology
- j) Uses of perfluorocarbons in Ophthalmology

M.S OPHTHALMOLOGY

PAPER II

(CLINICAL OPHTHALMOLOGY)

1. Describe in detail the effects of ocular perforating injury and its management
20 Marks
2. Merits and demerits of small incisions cataract surgery and IOL 10 Marks
3. Write short notes on: 7 X 10 = 70 Marks
 - a) Management of congenital glaucoma
 - b) Aetiopathogenesis of neovascularisation of Iris, its impact and management
 - c) Indications and method of transfrontal orbitotomy
 - d) Vogt koyanagi Harada's syndrome
 - e) AV Phenomenon in squint

M.S OPHTHALMOLOGY

PAPER III

(PRINCIPLES AND PRACTICE OF OCULAR SURGERY)

- Time: 3 Hours Marks: 100
1. Discuss in detail the management of endophthalmitis 20 marks
 2. Management of Diabetic Retinopathy 10 marks
 3. Write short notes on 7 X 10 = 70 marks
 - a) Plus disease in retinopathy of prematurity
 - b) Pars planitis
 - c) Localising signs of intra cranial tumours
 - d) Genetic counselling in retinoblastoma
 - e) Ocular changes in pregnancy induced hypertension

M.S OPHTHALMOLOGY

PAPER IV

(COMMUNITY OPHTHALMOLOGY ,RECENT ADVANCES).

LIST OF BOOKS

Must refer

- Oculoplastic Surgery - Smell
- Adler.s Physiology
- Smolin . Cornea
- Subspeciality manuals . American Academy of Ophthalmology

- Text Book of Ophthalmology . Amar Agarwal
- Stepren Ryan . Retina & Vitreous
- OCT . Dr. Amod Gupta . Vaishali Gupta
- Perimetry . Harrison
- Von Noodern & Helverton . Atlas of Strabismus

LIST OF JOURNALS

Indian

1. Indian Journal of Ophthalmology
2. Delhi Journal of Ophthalmology

Foreign

- British Journal of Ophthalmology
- International Ophthalmology clinics
- Survey of Ophthalmology
- Year Book of Ophthalmology
- American Journal of Ophthalmology
- Archives of Ophthalmology
- Ophthalmology
- Journal of Cataract and Refractive Surgery

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Syllabus and Curriculum for MS - ORTHOPEDICS

2012

COURSE GOAL & OBJECTIVES

Major Goal:

Patient care Ability: A postgraduate in orthopaedics surgery at the end of its 3 year course should develop proper clinical acumen to interpret diagnostic results and correlate them with symptoms from history taking and become capable to diagnose the common clinical conditions/ disease in the specialty and to manage them effectively with success without making any serious complications and sincerely to take such accurate decision, for the patient's best interest including making a referral to consultation with a more experienced colleague/professional friend while dealing with any patient with a difficult condition.

Teaching ability: He/she also should be able to teach an MBBS student about the commonly encountered conditions in orthopaedics pertaining to their diagnostic features, basic pathophysiological aspect and the general and basic management strategies.

Research Ability: He/she should also acquire elementary knowledge about research methodology, including record-keeping methods, and be able to conduct a research inquiry including making a proper analysis and writing a report on its findings.

Team work: He/she should be capable to work as a team member. He/she should develop general humane approach to patient care with communicating ability with the patient's relatives especially in emergency situation such as in casualty department while dealing with cancer patients and victims of accident. He/she should also maintain human values with ethical consideration.

OBJECTIVES OF THE POST-GRADUATE COURSE

A postgraduate at the end of a 3-year P.G. degree course should acquire the following:

1. Cognitive knowledge: Describe embryology, applied anatomy, physiology, pathology, clinical features, diagnostic procedures and the therapeutics including preventive methods, (medical/surgical) pertaining to musculo-skeletal system.
2. Clinical decision making ability & management expertise: Diagnose conditions from history taking, clinical evaluation and investigations and develop expertise to manage medically as well as surgically the commonly encountered, disorders and disease in different areas as follows:
 - (a) Pediatric orthopaedics- The student should be exposed to all aspects of congenital and developmental disorders such as CTEV (club-Foot), developmental dysplasia of hip, congenital deficiency of limbs, Perthe's disease and infections, and also to acquire adequate knowledge about the principles of management of these disorders.

- (b) Orthopaedic oncology- The resident is expected to be familiar with the tumours encountered in orthopaedic practice. The recent trends towards limb salvage procedures and the advances in chemotherapy need to be familiar to him.
 - (c) Management of Trauma- Trauma in this country is one of the main causes of morbidity and mortality in our demographic statistics. The student is expected to be fully conversant with trauma in its entirety. In any type of posting after qualification the orthopaedic surgeon would be exposed to all varieties of acute trauma. Hence, it is his responsibility to be able to recognize, assess and manage it including the medico legal aspects.
 - (d) Sports Medicine- A lot of importance is being given to sports medicine especially in view of the susceptibility of the athlete to injury and his failure to tide over them. Sports medicine not only encompasses diagnostic and therapeutic aspects of athletic injuries but also their prevention, training schedules of personnel & their selection.
 - (e) Physical Medicine and Rehabilitation- The student is expected to be familiar with this in all its aspects. Adequate exposure in the workshop manufacturing orthotics and prosthetics is mandatory, as is the assessment of the orthopedically handicapped.
 - (f) Orthopedic Neurology- The student should be exposed to all kinds of nerve injuries as regards their recognition & management cerebral palsy and acquired neurologic conditions such as post polio residual paralysis also need to be emphasized in their entirety.
 - (g) Spine Surgery- The student is expected to be familiar with various kinds of spinal disorders such as scoliosis, kypho-scoliosis, spinal trauma, PIVD, infections (tuberculosis and pyogenic), & tumours as regards their clinical presentations and management.
 - (h) Basic sciences in Orthopaedics- This deals with some of the fundamentals in orthopaedics such as the structure and function of bone cartilage etc, and their metabolic process. In addition the student learns about implants in orthopaedics and their metallurgy.
 - (i) Radiology- Acquire knowledge about radiology/imaging and to interpret different radiological procedures and imaging in musculo-skeletal disorders. There should be collaboration with Radiology department for such activities.
 - (j) Psychologic and social aspect- Some elementary knowledge in clinical Psychology and social, work management is to be acquired for management of patients, especially those terminally ill and disabled-persons and interacting with their relatives.
3. Teaching: Acquire ability to teach an MBBS student in simple and straightforward language about the common orthopaedic ailment/disorders especially about their signs/symptoms for diagnosis with their general principles of therapy.
 4. Research: Develop ability to conduct a research enquiry on clinical materials available in Hospital and in the community.

5. Patient doctor relation: Develop ability to communicate with the patient and his/her relatives pertaining to the disease condition, its severity and options available for the treatment/therapy.
6. Preventive Aspect: Acquire knowledge about prevention of some conditions especially in children such as poliomyelitis, congenital deformities, cerebral palsy and common orthopaedic malignancies.
7. Identification of a special areas within the subject: To further develop higher skills within the specialty in a specialized are such as Arthroplasty, Neurology, Arthroscopy oncology, spine surgery, hand surgery and Rheumatology, identify some area of interest during the residency and do fellowship/ senior residency programme in one of such areas.
8. Presentation of Seminar/paper: Should develop public speaking ability and should be able to make presentation on disease-conditions/research topics to fellow colleagues in a Seminar/meeting/ conference using audiovisual aids.
9. Research writing: Should be capable to write case-reports and research papers for publication in scientific journals.
10. Team work: Team spirit in patient management, working together in OPD, OT, ward and sharing responsibility with colleagues such as doctor, nurses and other staff are essential. Resident has to develop these attributes through different mechanism of infection

PRACTICAL TRAINING:

A Junior Resident doctor, pursuing a P.G. Degree course is expected to perform major and minor surgical procedures independently as well as under supervision of a faculty member/senior resident.

She/he should be able to do many major procedures independently such as: (Few examples only given):

- 1 Closed reduction of fractures and dislocations
- 2 External fixation of compound fractures
- 3 Debridement of crush injuries
- 4 Amputations
- 5 Internal fixation of common simple diaphyseal fractures
- 6 Polio surgery such as TA lingthening, steindler's procedure etc
- 7 Intra-articular injections
- 8 Steroid injections for various painful conditions
- 9 Sequestrectomy in chronic osteomyelitis
- 10 Corrective POP casts for club foot & other congenital deformities
- 11 Biopsy from a mass and exiscions of exostosis, ganglion
- 12 Able to perform arthrotomy, patellectomy, radial head exsicion

He/she should be able to do the following operations under supervision/guidance of senior colleagues/ faculty member (Few examples only given):

- Internal fixation of simple fractures such as fracture of both bones of forearm, supracondylar fracture humerus, malleolar fractures, femur shaft fractures, per trochanteric fractures etc.
- Polio surgery such as Jone's procedure Campbell's procedure, triple arthrodesis, lambrinndi procedure etc.
- Club foot surgery such as postero-medial soft tissue reease, dilwyn-ewan's procedure, triple arthrodesis, JESS fixator, ilizarov fixator application.

DURATION OF TRAINING AND ROTATION PROGRAMMES (WARD/OT/OPD)

FIRST YEAR

- I.)– Spends 6 (six) months in orientation programme including exposure to casualty
- Learns bedside history taking in ward, OT exposures, casualty, ICU requirement and their visit to related disciplines such as physical medicine and rehabilitation/Anesthesia.
 - Care of indoor (medical; preoperative and postoperative) patients for a minimum period of 6 months and learn techniques of traction would care and splintage.
 - Attends operation theatre and emergency operations for acclimatization.
 - Assists ward rounds and visits other wards with senior colleagues to attend call/consultations from other department.
 - Participates in the teaching sessions in ward for bedside clinical in the weekly afternoon seminar/journal club.
- II.)After 6 months of orientation during 2 ½ yrs:
- Attends orthopaedics OPD 3 day a week
 - Discuss problematic cases with the consultant (s) in OPD/ward
 - Attends operation room/theatre 3 days a week
 - Attend 2 morning rounds/ week
 - Care of the indoor patients on beds allotted to him/her.
 - Attends the weekly Journal Club and seminar and presents the same by rotation
 - Attends scoliosis, polio, hand, CTEV, arthritis clinics and presents cases participates in discussions including therapy-planning etc.
- III.)During the 2 ½ years, the resident must attend the combined teaching
- Programme of the department of surgery, Neurosurgery and Medicine i.e. clinical meetings, CPC's of students and staff of the whole hospital
 - Surgicopathological conference in Pathology Department, with surgeons.
 - All kinds of specially prepared lectures by department. Faculty or from R.T./plastic or Neurosurgery Departments.
 - Visits by rotation the Rural Clinic for community exposures/work experience.
 - Does 24 hours-emergency duty once a week/ as per roster of the department.
 - Attends lectures by visiting faculty to the department/college from India/abroad.
 - Attends/participate/present papers in state/zonal national conferences.
 - Actively participate/help in organization of departmental workshop, courses in specialized areas like Arthroplasty, Arthroscopy, Spine, Hand surgery from time to

time. Research methodology / reporting on research: Learns the basics in research methodology and make the thesis protocol with the 4 months of admission.

- Problem oriented record keeping including use of computer
- Use of medical literature search including through Internet use, in the library.
- Attends bio statistics classes by arrangement.
- Research Report – writing including preparation of Protocol for Research/Thesis.
- Writing an abstract/short paper/presentation style (slide-making & audiovisual aids).
- Preparation of a report on a research project/Thesis.
- Humanity/Ethics:
 - Lectures on humanity including personality development, team spirit and ethical issues in patient care and human relationship including, public relations, by Psychologist and public relation officers are to be arranged by the department/college.

Presentation for the Thesis work:

- (a) Selection of thesis topic: Subject of thesis will be selected by the candidate under guidance of faculty, which will be approved by the departmental guide and other faculty. The candidate will be asked to submit the protocol within 4 (Four) month of admission after it is scrutinized by departmental faculty. It is to be approved by the central thesis committee of the institute/college if such committee does exist, and the ethical considerations are also discussed in such Research Programme Committee.
- (b) Once the thesis protocol is approved the candidate starts his research work under direct supervision of guide and co-guides.
- (c) Six monthly progress of the thesis will be checked to know the outcomes/or difficulties faced by the candidate. Candidate will be asked to submit the thesis 4 months before the final exams. At the discretion of director/thesis committee one month extension may be given to a candidate for submission of the protocol and the final thesis for any valid reason for the delay.

Teaching Methods:

The following learning methods are to be used for the teaching of the postgraduate students:

1. Journal club: 1 hrs duration –Paper presentation/discussion – once per week (Afternoon).
2. Seminar: One seminar every week of one hour duration (Afternoon)
3. Lecture/discussion: Lectures on newer topics by faculty, in place of seminar/as per need.
4. Case presentation in the ward and the afternoon special clinics (such as scoliosis/Hand clinics).Resident will present a clinical case for discussion before a faculty and discussion made pertaining to its management and decision to be recorded in case files.

5. Case Conference- Residents one expected to work-up one long case and three short cases and present the same to a faculty member and discuss the management in its entirety on every Monday afternoon.
6. X-Ray Classes- Held twice weekly in morning in which the radiologic features of various problems are discussed.
7. Surgicopathological Conference: Special emphasis is made on the surgical pathology and the radiological aspect of the case in the pathology department such exercises help the ortopaedics/Pathology/Radiology Residents.
8. Combined Round/Grand Round: These exercises are to be done for the hospital once/wk or twice/month involving presentation of usual or difficult patients. Presentations of cases in clinical combined Round and a clinical series/research data on clinical materials for benefit of all clinicians/Pathologists/other related disciplines once in week or forthrightly in the Grand round.
9. Community camps: For rural exposure and also for experiences in preventive aspect in rural situation/hospital/school, patient care camps are to be arranged 2-3/ year, involving residents/junior faculty.
10. Emergency situation: Casualty duty to be arranged by rotation among the PGs with a faculty cover daily by rotation.
11. Afternoon clinics: Scoliosis Clinic- Held once a week. Residents work up the cases of spinal deformity and present them to a faculty member and management plan recorded in case file.
Hand Clinic- Held once a week. All the cases of hand disorders are referred to the clinic and discussed in detail.
CTEV Clinic- Held once a week corrective casts are given and the technique learnt by the residents. Surgical management in also planned & recorded in case file.
Polio- Clinic- Held once a week, Various braces & Calipers are prescribed and surgical management planned.
12. Besides clinical training for patient care management and for bed side manners: Daily for ½ to one hour's during ward round with faculty and 1-2 hours in the evening by senior resident/faculty on emergency duty, bed side patient care discussions are to be made.
13. Clinical teaching:
In OPD, ward rounds, emergency, ICU and the operation theatres:
Residents/Senior Residents and Faculty on duty in respective places – make discussion on clinical diagnosis/surgical procedures/treatment modalities, including postoperative care and preparation of discharge slip.
14. Clinical interaction with physiotherapist:
Clinical interaction with physiotherapist pertaining to management of the patients in post-op mobilization.

15. Research Methodology:

Course and Lectures are to be arranged for the residents for language proficiency by humanity teachers besides few lectures on human values and ethical issues in patient care.

16. Writing Thesis:

Thesis progress is presented once in 6 months and discussion made in the department. Guides/coguides are to hear the problems of the candidate; can provide assistance to the student. Progress made or any failure of the candidate may be brought to the notice of college Dean/Principal.

Assessment:-

General Principles

- The assessment should be valid, objective, and reliable.
- It must cover cognitive, psychomotor and affective domains.
- Formative, continuing and summative (final) assessment should be conducted in theory as well as practicals/clinicals. In addition, thesis should be assessed separately.

Overall Weightage

Internal assessment - 20%

Final summative examination - 80%

Formative assessment

The formative assessment should be continuous as well as end-of-term. The former should be based on the feedback from the senior residents and the unit faculty concerned. End-of-term assessment should be held at the end of each semester (upto the 5th semester). Formative assessment will not count towards pass/fail at the end of the program, but will provide feedback to the candidate. Scheme of internal assessment examination It is held by means of a written test and practical (and or clinical) with viva examination by all consultants of the department as per distribution of marks as follows. In such five six monthly tests a candidate shall be evaluated for 1000 marks in total i.e. 200 marks in each term as follows.

Item	1st term	2nd term	3rd term	4th term	5th term
Theory	75 marks	75 marks	75 marks	75 marks	75 marks
Oral, Practical/clinical	75 marks	75 marks	75 marks	75 marks	75 marks
Log book evaluation	50 marks	50 marks	50 marks	50 marks	50 marks
Total	200 marks	200 marks	200 marks	200 marks	200 marks
Gross total	1000 marks				
Carried forward to Final MD/MS Examination	20 % marks ~ 200 marks				

200 marks shall be carried over a period of five terms as follows.

- Log book evaluation- 10 x 5terms= 50 marks
- Theory exam 15 x 5terms= 75 marks
- Oral ,Practical/Clinical exam 15 x 5terms= 75 marks

Evaluation of the Log book:

Each candidate should be required to maintain a log book in which following details will be entered and evaluated on a scale of 1 to 10. At end of each term of 6months of training for 5such terms the logbook will be evaluated and a score is to be calculated out from a maximum of 100 marks for the 10 items as entered in the logbook.

- i. skills learned independently, under supervision or assisted by him. 1 to 10
- ii. Presentations in journal clubs 1 to 10.
- iii. Cases presented in clinical meetings 1 to 10
- iv. Presentation in departmental seminars..... 1 to 10
- v. Intra and interdepartmental training and evaluation details.....1 to 10
- vi. Teaching activities.....1 to 10
- vii. Conferences/workshops/CME attended 1 to 10
- viii. Papers presented/published conferences.....1 to 10
- ix. Didactic lectures attended.....1 to 10
- x. Thesis progress and evaluation details.....1 to 10

MD Examination:

Pattern of question for theory Papers- There shall be four theory papers. One paper out of these shall be on 'Basic Medical Sciences' and one paper on 'Recent Advances' in the discipline. There shall be 100 marks for each paper to be answered in 3 hours' time. There shall be '1 structured essay type question' for 20 marks besides 8'short essay type questions' for 10 marks each in each paper.

Days of practical examination-Practical Examination should be conducted for a batch of upto 8 candidates over a minimum period of two to three days extendable up to 7days subject to the subject curriculum with due approval of the board of examiners. For a batch of more than 8 the examination may extend accordingly. The theory papers shall be evaluated at the examination center itself before commencement of the practical/clinical and oral examination in the subject during these practical examination days.

Components of examination-It consist of a written examination, a practical examination to assess the clinical/practical competencies and skills, and a viva voce examination.

The examinations shall consist of A) theory

B) practical including clinical

C) oral

A.Theory-

The 4 papers in theory shall be conducted well in advance before the oral , clinical/practical examination.

B. Practical

Clinical/Practical examination is the most important part of the evaluation and is aimed at assessing the clinical/practical skills of the candidate and diagnostic reasoning. Entirely objective evaluation of these skills is neither feasible nor desirable. However, in order to test the various skills, the examiners may evaluate the candidates on a structured format.

C. Pedagogic Skill

The candidate shall be allotted a topic from the discipline at a short notice of few hours, (preferably on the first day of the examination) to prepare and present before the board of examiners within a time span of 15 minutes (preferably on the second day of the examinations) . The teaching skill will be evaluated under various points(as illustrated below) and marks given accordingly.

- (i) Choice of article/topic (unless specifically allotted)
- (ii) Completeness of presentation
- (iii) Clarity of presentation
- (iv) Understanding of the subject and ability to convey the same
- (v) Whether relevant references have been consulted
- (vi) Ability to convey points in favour and against the subject under discussion
- (vii) Use of audio-visual aids
- (viii) Ability to answer questions
- (ix) Time scheduling
- (x) Overall performance

D. Viva-Voce

a.Viva-voce is expected to be conducted at every stage of the practical examination. The resident will be required to answer oral questions on any aspect of the specialty. Oral examination is designed to test the general scientific background of the candidate and his/her own particular contribution embodied by the thesis. A formal "grand viva-voce" may be held at the end of the practical examination. Questions on the thesis/dissertation may be asked at this time as well. The board of examiners will conduct the examination. They will read out the comments & questions and will seek the answers from the candidate. The viva voce should be assessed under the following headings:

1. Thesis viva voce
2. Grand viva voce

All examiners shall be jointly responsible for all parts of the examination. In presence of the external examiners, the Chairman of the conducting board shall make the necessary arrangements for conducting the oral and practical including clinical examination at the department in the college centre .

b. The candidate shall bring the logbook and a copy of his/her thesis mandatorily while appearing for the oral, practical and clinical examination.

Marks for examinations: The examinations shall be organized on the basis of marking system to evaluate and certify candidate's level of knowledge, skill and competence as per distributions mentioned below. In total the overall assessment for a postgraduate shall be for 1000 marks distributed as follows.

A.Internal assessment exam(200 marks)

- Theory 15x5=75
- Practical (Oral, clinical and practical) 15x5=75
- Log book evaluation 10x5=50
- Total : 40x5=200

B.Final MD/MS exam (800 marks)

- Theory (100 x 4 Papers) 400
- Oral ,Clinical/Practical 400
- I)Clinical/Practical (300 marks)
- Long exercise (one) 80 marks
- Short exercise (three) 120 marks
- OSPE(ten) 40 marks
- Spots(ten) 40 marks
- Pedagogic skill 20 marks

II) Viva		(100 marks)
Thesis Viva		20 marks
Grand Viva		80 marks
Grand Total	(A+B)=	1000 marks

PASS/FAIL- In order to pass the examination in each subject a candidate must secure not less than 50% marks in each head of passing which shall include (1) Theory (2) Practical including clinical and viva voce examination (3) internal assessment examination.

Plan of MD/MS Examination:-

The PG examination shall be carried out in three parts:-

1.Theory :-

- There shall be 4 papers with 100 marks for 3hours duration of examination each.
- There shall be 1 structured essay type questions for 20 marks along with 8 short answer type questions for 10 marks each in each paper.
- The chapter distribution for the papers shall be as follows.

paper-I : basic science related to orthopedics.

paper-II : principle and practice of orthopedics.

paper-III : traumatology, rehabilitation, physical medicine,
applied general surgery.

paper-IV : recent advances.

2. Practical Examination –

(b) Identification of Surgical Pathology, excised specimens & discussion, reading X-rays & CT Scan/MRI, identification of Instruments & discussion, identification of braces & calipers & discussion thereon.

(c) Clinical Patient presentation/discussion:

(i) One long case: The long case will be structured comprising – history taking, clinical examination, investigations, decision making, proposed treatment modalities, ethical justification and personal attributes.

(ii) Three short cases: The short cases will also be structured in which only one particular system may be considered and therapy decision/discussion, made.

EXAMINERS/ Final Examinations:

(a) There shall be four examiners including two external and two internal. One of the internal examiners will be the Head of Department and he she shall be chairman/Convener. The second internal examiner shall be next senior most member of faculty of the department provided he/she is eligible for such duty. The necessity of an external examiner is to maintain the standard of the examination at the National level. All examiners must be a full time teacher with requisite experience as per MCI guidelines. Hony teacher with previous full time experience (of 10 years standing) may only be made examiners if there does not exist nay a full time qualified faculty under the

same university/ college. No Hony. Faculty shall be made a chairman/convener of the examination.

- (b) The external examiners will be asked to send two sets of question papers for the theory examination.

There will be 2 external examiners from a different university so that the number of questions available, will be double the which will be given to the student in the moderate papers. The Chief internal examiner or Chairman/Convener will moderate it and finally make two sets of question paper, containing 8-10 shorts questions. He/she shall send both sets of such papers to the university and university will decide to give one of the sets to the students.

- (c) All examiners shall be jointly responsible for the examination. In presence of the external examiners, the Chairman and the internal examiner shall make the necessary arrangements for conducting the final examination. Not more than 4 students will be evaluated/examined per day in any Center. For different College/Institution, separate examination center/examiners may be arranged/appointed for convenience and proper administration of the final examination. While preparing the final results, formative assessment of the students shall be taken into consideration and the results will be sent to the university under seal cover.

Syllabus for individual papers:

Paper-I:

Basic Sciences:

Development of skeleton, histology of cartilage histology & histopathology of bone, physiology of fracture healing and delayed and non-union of bones, histology of skeletal muscle, collagen, physiology and mineralization of bone, physiology of cartilage, biophysical properties of bone and cartilage, metabolic bone disease and related dysfunction of parathyroid glands.

Paper-II:

Principles & Practice of orthopaedics:

Bone Infections (Pyogenic, tuberculosis syphilis, mycotic infections, salmonella & brucellar osteomyelitis), congenital deformities (upper & lower extremities, spine and general defects), developmental conditions (osteogenesis imperfecta, dysplasias, hereditary multiple exostosis etc.) diseases of the joints(osteoarthritis, Rheumatoid arthritis, neuropathy joints, ankylosing spondylitis, sero-negative spondyloarthropathy, traumatic arthritis etc.) orthopaedic neurology, tumors of bone.

- Disease of muscle fibrin disease peripheral vascular diseases
- Disorders of hand & their management

General surgery, oncology, and & Medicine as applicable to the musculo-skeletal disorders/disease.

Radiology, Imaging – computed tomography and magnetic resonance imaging, (MRI) and interventional radiology and angiography as related to orthopaedics.

General pathologic aspects such as wound healing and also pathology and pathogenesis of orthopaedic disease, pharmacology, molecular biology, genetics, cytology, haematology, and immunology as applicable to orthopaedics.

Paper-III:

Traumatology, rehabilitation, physical medicine, applied general surgery.

- General principles of fracture management fractures of lower extremity, fractures of pelvis and hip, fractures of upper extremity and shoulder girdle, fractures and dislocations in children, malunited fractures, delayed union and non-union of fractures, acute dislocations, old unreduced dislocations, recurrent dislocations.
 - General principles of traumatology and also neck injury, Plastic surgery as applicable to orthopaedics.

Paper-IV:

(Recent advances in orthopaedics)

Arthroscopy, LASER, Endoscopic minimally invasive spine surgery, allografts & bone banking Ilizarov & bone transport, chemotherapy of cancers.

Training Programme

I. **Orientation program:** in ward, OPD, OT, Common Foundation Course 6 month.

Emergency (6 months)

II. **DISCIPLINE TRAINING** (During – 2 ½ yrs)

- A. Ward Round daily (Patient care/Teaching)
- B. OPD – Case base learning & Patient care
- C. Demonstration of operative procedures in OT & Trauma Management in causality
- D. Case-presentation/discussion (Afternoon special clinics)
- E. Journal Club Weekly
- F. Seminar weekly including presentation of thesis progress
- G. Surgicopathological conference - monthly
- H. Radiology Conference – weekly
- I. Thesis submission after final presentation
 - J. Seminar weekly including presentation of thesis progress
- K. Surgicopathological conference - monthly
- L. Radiology Conference – weekly

III. ROTATION –EXTRA DEPARTMENTAL

FMT	2weeks
Radiology	2weeks
Trauma center	4weeks
Surgical ICU	4weeks
Anesthesiology	2weeks
Surgery	2weeks
Neurosurgery	4weeks
Uro-surgery	4weeks
Central casualty	4weeks
FMT	2weeks

iv. **Attendance of State, Zonal/National level conferences /workshops/symposium** during (2nd – 3rd yr.) Final exams.

RECOMMENDED READING

Title of the book	Author	Publisher
1) Watson Jones-Fractures	J.N. Wilson	Churchill Livingstone
2) Fractures, Dislocations and Sprains		And Joint Injuries Kay & Conwell C.V. Mosby
3) Outlines of Fractures		Crawford Adams Churchill Livingstone

Closed Treatment of Fractures H.John Charnley Churchill Livingstone

Outlines of Orthopaedics Crawford Adams Churchill Livingstone

Mercer's Orthopaedics Surgery Duthie Edward Arnold

Fundamentals of Philip Wiles Churchill Livingstone

Orthopaedic Surgery

Paediatric Orthopaedic And Fractures WJ Sherrad Butterworth

Orthopaedic Diseases Aegerter and Kirkpatrick Saunders

Tumours and Tumourous

Conditions of Bone and Joints Jaffe Lea Febiger

Campbell's Operative A H Crenshaw C V Mosby

Orthopaedics

Extensive Exposure A K Henry Churchill Livingstone

Hand book of Physical Kottae

Medicine Krusen Ellwood

Rehabilitation Medicine Howard & Rusk

Electrodiagnosis Sidney Licht

Kinesiology Rach & Bruke

AO Principles of internal fixation- AO foundation

Samuel turek's textbook of orthopaedics

Rockwood Principles of fracture treatment in adults

Rockwood principles of fracture treatment in children

JOURNALS

Indian Journal of Orthopaedics.

Journal of Bone and Joint Surgery (British & American Volumes).

Orthopaedic Clinics of North America.

Clinical Orthopedics and Related Research

Yearbook of Orthopaedics.

British journal of Rheumatology and Physical Medicine.

Journal of rehabilitation, Bombay.

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**Syllabus and Curriculum
for
MS – EAR NOSE THROAT
2012**

Preamble

A postgraduate specialist having undergone the required training should be able to recognize the health needs of the community, should be competent to handle effectively medical problems and should be aware of the recent advances pertaining' to his speciality. The PG student should acquire the basic skills in teaching of medical/para-medical students. He /she is also expected to know the principles of research methodology and modes of consulting library.

Programme Objectives

At the end of postgraduate training the student should be able to: -

- Practice his speciality ethically
- Demonstrate sufficient understanding of basic sciences related to his speciality.
- Diagnose and manage majority of conditions in his speciality (clinically and with the help of relevant investigations)
- and advise measures for the prevention and rehabilitation of patients belonging to his speciality
- Play the assigned role in the implementation of National Health Programs
- Demonstrate competence in basic concepts or research methodology
- Develop good teaching skills

Specific learning objectives

- a) **Theoretical knowledge:** A student should have fair knowledge of basic sciences (Anatomy, Physiology, Biochemistry, Microbiology, Pathology and Pharmacology) as applied to his speciality. He/she should acquire in-depth knowledge of his subject including recent advances. He should be fully conversant with the bedside procedures (diagnostic and therapeutic) and having knowledge of latest diagnostics and therapeutics available.
- b) **Clinical/Practical skills:** A student should be expert in good history taking, physical examination, providing basic life support and advanced cardiac life support, common procedures like FNAC, Bio(J"Y, aspiration from serous cavities, lumbar puncture etc. He/she should be able to choose the required investigations.
- c) **Research:** He/she should know the basic concepts of research methodology, plan a research project and should know how to consult library. Basic knowledge of statistics is also required.
- d) **Teaching:** Should learn the basic methodology of teaching and develop competence in teaching medical / paramedical students.

Postgraduate Training program

Didactic lectures are of least importance; seminars, journal clubs, symposia, reviews and guest lectures should get priority for theoretical knowledge. Bedside teaching, grand rounds, interactive group discussions and clinical demonstrations should be the hallmark of clinical / practical learning. Student should have hand-on training in performing various procedures (medical / surgical concerning his subject) and ability to interpret various tests / investigations. Exposure to newer specialized diagnostic / therapeutic procedures concerning his subject should be given.

Clinical postings

Neurosurgery	2weeks
General surgery	2weeks
Medicine	2 weeks
Pathology	2weeks
ICU	4weeks
Radiology	2 weeks
Radiotherapy	4 weeks
Anaesthesia	4 weeks

ASSESSMENT:-

General Principles

- The assessment should be valid, objective, and reliable.
- It must cover cognitive, psychomotor and affective domains.
- Formative, continuing and summative (final) assessment should be conducted in theory as well as practicals/clinicals. In addition, thesis should be assessed separately.

Overall Weightage

Internal assessment - 20%

Final summative examination - 80%

Formative assessment

The formative assessment should be continuous as well as end-of-term. The former should be based on the feedback from the senior residents and the unit faculty concerned. End-of-term assessment should be held at the end of each semester (upto the 5th semester). Formative assessment will not count towards pass/fail at the end of the program, but will provide feedback to the candidate. Scheme of internal assessment examination It is held by means of a written test and practical (and or clinical) with viva examination by all consultants of the department as per distribution of marks as follows. In such five six monthly tests a candidate shall be evaluated for 1000 marks in total i.e. 200 marks in each term as follows.

Item	1st term	2nd term	3rd term	4th term	5th term
Theory	75 marks	75 marks	75 marks	75 marks	75 marks
Oral, Practical/clinical	75 marks	75 marks	75 marks	75 marks	75 marks
Log book evaluation	50 marks	50 marks	50 marks	50 marks	50 marks
Total	200 marks	200 marks	200 marks	200 marks	200 marks
Gross total	1000 marks				
Carried forward to Final MD/MS Examination	20 % marks ~ 200 marks				

200 marks shall be carried over a period of five terms as follows.

- Log book evaluation- 10 x 5terms= 50 marks
- Theory exam 15 x 5terms= 75 marks
- Oral ,Practical/Clinical exam 15 x 5terms= 75 marks

Evaluation of the Log book:

Each candidate should be required to maintain a log book in which following details will be entered and evaluated on a scale of 1 to 10. At end of each term of 6months of training for 5such terms the logbook will be evaluated and a score is to be calculated out from a maximum of 100 marks for the 10 items as entered in the logbook.

- i. skills learned independently, under supervision or assisted by him. 1 to 10
- ii. Presentations in journal clubs1 to 10.
- iii. Cases presented in clinical meetings 1 to 10
- iv. Presentation in departmental seminars..... 1 to 10
- v. Intra and interdepartmental training and evaluation details.....1 to 10
- vi. Teaching activities.....1 to 10
- vii. Conferences/workshops/CME attended 1 to 10
- viii. Papers presented/published conferences.....1 to 10
- ix. Didactic lectures attended.....1 to 10
- x. Thesis progress and evaluation details.....1 to 10

MD Examination:

Pattern of question for theory Papers- There shall be four theory papers. One paper out of these shall be on ‘Basic Medical Sciences’ and one paper on ‘Recent

Advances' in the discipline. There shall be 100 marks for each paper to be answered in 3 hours' time. There shall be '1 structured essay type question' for 20 marks besides 8'short essay type questions' for 10 marks each in each paper.

Days of practical examination-Practical Examination should be conducted for a batch of upto 8 candidates over a minimum period of two to three days extendable up to 7days subject to the subject curriculum with due approval of the board of examiners. For a batch of more than 8 the examination may extend accordingly. The theory papers shall be evaluated at the examination center itself before commencement of the practical/clinical and oral examination in the subject during these practical examination days.

Components of examination-It consist of a written examination, a practical examination to assess the clinical/practical competencies and skills, and a viva voce examination.

The examinations shall consist of

- A) theory
- B) practical including clinical
- C) oral

A.Theory-

The 4 papers in theory shall be conducted well in advance before the oral , clinical/practical examination.

B. Practical

Clinical/Practical examination is the most important part of the evaluation and is aimed at assessing the clinical/practical skills of the candidate and diagnostic reasoning. Entirely objective evaluation of these skills is neither feasible nor desirable. However, in order to test the various skills, the examiners may evaluate the candidates on a structured format.

C. Pedagogic Skill

The candidate shall be allotted a topic from the discipline at a short notice of few hours, (preferably on the first day of the examination) to prepare and present before the board of examiners within a time span of 15 minutes (preferably on the

second day of the examinations) . The teaching skill will be evaluated under various points(as illustrated below) and marks given accordingly.

- (i) Choice of article/topic (unless specifically allotted)
- (ii) Completeness of presentation
- (iii) Clarity of presentation
- (iv) Understanding of the subject and ability to convey the same
- (v) Whether relevant references have been consulted
- (vi) Ability to convey points in favour and against the subject under discussion
- (vii) Use of audio-visual aids
- (viii) Ability to answer questions
- (ix) Time scheduling
- (x) Overall performance

D. Viva-Voce

a. Viva-voce is expected to be conducted at every stage of the practical examination. The resident will be required to answer oral questions on any aspect of the specialty. Oral examination is designed to test the general scientific background of the candidate and his/her own particular contribution embodied by the thesis. A formal "grand viva-voce" may be held at the end of the practical examination. Questions on the thesis/dissertation may be asked at this time as well. The board of examiners will conduct the examination. They will read out the comments & questions and will seek the answers from the candidate. The viva voce should be assessed under the following headings:

1. Thesis viva voce
2. Grand viva voce

All examiners shall be jointly responsible for all parts of the examination. In presence of the external examiners, the Chairman of the conducting board shall make the necessary arrangements for conducting the oral and practical including clinical examination at the department in the college centre .

b. The candidate shall bring the logbook and a copy of his/her thesis mandatorily while appearing for the oral, practical and clinical examination.

Marks for examinations: The examinations shall be organized on the basis of marking system to evaluate and certify candidate's level of knowledge, skill and competence as per distributions mentioned below. In total the overall assessment for a postgraduate shall be for 1000 marks distributed as follows.

A.Internal assessment exam(200 marks)

• Theory	15x5=75
• Practical (Oral, clinical and practical)	15x5=75
• Log book evaluation	10x5=50
Total :	40x5=200

B.Final MD/MS exam (800 marks)

• Theory (100 x 4 Papers)	400
• Oral ,Clinical/Practical	400
I)Clinical/Practical	(300 marks)
Long exercise (one)	80 marks
Short exercise (three)	120 marks
OSPE(ten)	40 marks
Spots(ten)	40 marks
Pedagogic skill	20 marks
II) Viva	(100 marks)
Thesis Viva	20 marks
Grand Viva	80 marks

Grand Total	(A+B)=	1000 marks
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PASS/FAIL- In order to pass the examination in each subject a candidate must secure not less than 50% marks in each head of passing which shall include (1) Theory (2) Practical including clinical and viva voce examination (3) internal assessment examination.

Plan of MD/MS Examination:-

The PG examination shall be carried out in three parts:-

1.Theory :-

- There shall be 4 papers with 100 marks for 3hours duration of examination each.
- There shall be 1 structured essay type questions for 20 marks along with 8 short answer type questions for 10 marks each in each paper.
- The chapter distribution for the papers shall be as follows.

<u>Theory</u>	<u>Title</u>
paper-I :	basic science
paper-II :	principles and practice of ENT.
paper-III :	principles of general surgery,head-neck surgery.
paper-IV :	recent advances.

2.Clinical Examination _ 2-3 clinical cases, X-Ray, instruments, clinical exercise etc. and via-vose,

COURSE CONTENTS (Components of Curriculum)

A.

- Anatomy & Physiology of Ear, Nose & Throat, Trachea and esophagus.
- The ears and nasal sinuses in the aerospace environment
- Physiological consideration of pressure effects on the ear and sinuses in deep water diving
- The generation and reception of speech
- Radiographic anatomy of the ear, nose, throat and imaging.
- Bacteriology in relation to Otorhinolaryngology
- Allergy and rhinitis
- The principles of cancer immunology with particular reference to head and neck cancer
- Principles of chemotherapy in head and neck cancer
- Haematology in relation to Otolaryngology
- Anaesthesia for Otolaryngology
- Pharmacology of drugs used in ENT
- Electrolyte, fluid balance/shock conditions
- Use of teaching aids
- Routine blood, urine testing
- Preparation of slides
- Facial nerve stimulation test
- Audiometric tests like pure tone Audiometry, Beckesy's Audiometry, Impedance Audiometry, Free field Audiometry, Specialized tests of hearing including SIS!, Tone decay, ABLB, Speech discrimination score etc.
- Vestibular tests like caloric testing (Water & Air) stopping test, Fukuda's test, cranio corpography recording of nystagmus by ENG and its interpretation.
- Evoked response audiometry.

EAR:

- The physical and functional examination of the ear
- The functional and physical examination of the vestibular system.
- Tinnitus
- Affections of external ear
- Repair of deformities of the external ear.
- Congenital conditions of the middle ear cleft
- Traumatic conductive deafness
- Acute inflammation of the middle ear cleft
- Non-suppurative otitis media
- Chronic suppurative otitis media
- Management of chronic suppurative otitis media

- Complications of infections of middle ear.
- Tumors of the middle ear cleft and temporal bone
- Diseases of the otic capsule-otosclerosis
- Diseases of the otic capsule-other diseases
- The deaf child
- Traumatic lesions of the inner ear
- Inflammatory lesions of the vestibular and auditory nerve
- Acoustic neuroma
- Ototoxicity
- Presbycusis
- Vascular lesions of the inner ear
- Diagnosis and management of sudden and fluctuant sensorineural hearing loss
- Meniere's disease
- Neurologic aspects of vertigo
- Facial paralysis
- Rehabilitation of adults with acquired
- Hearing loss-Hearing aids
- The cochlear Implants
- Nystagmus and Electronystagmography
- Skull baseNeurologic surgery

NOS

- Examination of the nose
- Conditions of the external nose
- Injuries of the facial skeleton
- Cosmetic surgery of the nose
- Congenital diseases of the nose
- The nasal septum
- Foreign bodies in the nose, rhinolith
- Epistaxis
- Acute chronic inflammations of the nasal cavities
- Vasomotor rhinitis-allergic and non-allergic
- Nasal polyposis
- Abnormalities of smell
- Acute sinusitis
- Chronic sinusitis
- Nasal Allergy|Fungal allergic sinusitis
- Complications of acute and chronic sinusitis
- Non healing granuloma of the nose
- Tumors of nose and sinuses
- Facial pains

- Trans-ethmoidal hypophysectomy
- Surgery of the pterygo palatine fossa.
- FESSILASER Surgery

THROAT

- Methods of examination of the mouth and pharynx
- Diseases of the mouth
- Diseases of the salivary glands
- Pharyngeal lesions associated with general diseases
- Diseases of the tonsils and adenoids (excluding neoplasms)
- Tumors of the pharynx
- Hypopharyngeal diverticulum (Pharyngeal Pouch)
- Oesophageal conditions in the practice of ear, nose and throat surgery
- Methods of examining and larynx and tracheobronchial tree
- Congenital diseases of the larynx
- Laryngeal disorders in singers and other voice users
- Neurological affections of larynx and pharynx
- Disorders of speech
- Intubation of the larynx, laryngotomy and tracheostomy
- Cervical node dissection
- Skin grafts in Otolaryngology
- Lower respiratory conditions in Otolaryngology
- Micro laryngeal surgery/thyroplasty

MISCELLANEOUS (HEAD AND NECK)

a)

- Functional Anatomy of cerebellum and brainstem
- Cranial nerves
- Raised intracranial tension-causes, diagnosis, management with particular reference to otitis hydrocephalus
- Head injuries and I.C. Haemorrhage
- Pituitary gland, anatomy, physiology hypo and hyper pituitarism, new growths.
- Intracranial venous sinuses and their affections

b)

- Osteology: skull, mandible cervical and thoracic vertebral sternum
- Cervical fascia, facial spaces in neck, retro pharyngeal and para pharyngeal Abscesses
- Anatomy and physiology of thyroid gland, goitre, diseases of the thyroid and carcinoma of thyroid
- Anatomy of mediastinum, large blood vessels in neck, thoracic duct development of major cervical and thoracic blood vessels.

- Pleura, plural cavity, bronchopulmonary segments and their clinical importance
- Facial plastic surgery
- Head and neck reconstructive surgery.

GENERAL

- Physiology of circulation, regulation of blood pressure, reactions of body to haemorrhage, pathophysiology of shock, fluid balance, blood transfusion and its hazards, fluid replacement therapy, burns.

DRUGS USED IN THE ENT

- Antihistaminic
- Nasal vaso constrictors
- Local anaesthetics
- Cortico steroids
- Cyto-toxic agents
- Antibiotics
- Radioactive isotopes
- Antifungal agents

O

**Syllabus and Curriculum
for
MD - PATHOLOGY
2012**

Departmental objectives

Curriculum- strategy, content, learning methods, curriculum outcome: - knowledge and skill

1. SCOPE OF TRAINING

It must be appreciated that within the time period of the training programme which covers a wide range of subjects and subspecialities it is difficult, if not impossible, to achieve full proficiency in all the technological methods and available theoretical knowledge. The following categorization is recommended:

1.1. High degree of Professional competence

In the following fields, related to diagnosis of appropriate diseases, a high degree of professional competence and theoretical knowledge is expected.

1.1.1. Pathologic Anatomy (Surgical Pathology and Cytopathology)

The study of pathologic anatomy includes all aspects of pathology as encompassed in the branches of General Pathology and systemic pathology. Therefore only a broad outline is provided and a compendium of chapters as available in standard textbooks avoided. The scope of pathology is vast and following is a guideline that in essence covers all aspects.

1.1.1.1. General pathology:

Normal cell and tissue structure and function. The changes in cellular structure and function in diseases. Causes and pathogenesis of diseases/ Reaction of tissue and organs to various lethal and sublethal injury.

1.1.1.2. Systemic pathology:

The study of normal structure and function of various organ systems and etiopathogenesis, gross and microscopic alterations of structure and function of these organ systems in diseases. All organ systems are to be studied. This forms the basis of Surgical Pathology, Cytopathology, Autopsy Pathology and Clinico-pathological correlation.

1.1.2. Hematology

The study of hematology includes all aspects of diseases of blood and bone marrow. This involves the study of the normal structure and function and the causes of diseases and morphological changes thereof.

1.2. Reasonable working knowledge

In the following fields the student is expected to achieve reasonable working knowledge and diagnostic skill, and be able to run independently a routine service in a teaching hospital, and if necessary, at some future date, with some additional effort acquire the level of competence as in 4.1. Some centers have separate

degrees/diplomas/postgraduate courses for some of these subjects. However, current practice of pathology, both institutional or otherwise demands a reasonable working knowledge of these subjects and therefore until such time as the situation demands, these subjects should be an integral part of postgraduate training in pathology.

1.2.1. Laboratory Medicine (Clinical Chemistry/Clinical Biochemistry/Chemical Pathology / Clinical Pathology including Parasitology).

1.2.2. Transfusion Medicine (Blood-Banking)

1.3. General Acquaintance

Following are the fields in which the student is expected to acquire a general acquaintance of techniques and principles and competence to understand and interpret data without being called upon to achieve technologic proficiency.

1.3.1. Immunopathology

1.3.2. Electron microscopy

1.3.3. Histochemistry

1.3.4. Immunohistochemistry

1.3.5. Use of radioisotopes

1.3.6. Cytogenetics

1.3.7. Tissue culture

1.3.8. Medical statistics

1.3.9. Molecular Biology

1.3.10. Maintenance of records

1.3.11. Information retrieval, Computer, Internet in medicine.

2. COURSE CONTENT

Unlike the undergraduate syllabus, it is difficult to give a precise outline of the Course Content for postgraduate training. A postgraduate appearing for the MD degree is supposed to have acquired not only professional competence expected of a well-trained specialist but also academic maturity, a capacity to reason and critically analyse a set of scientific data. He/She is supposed to keep himself up to date with the latest developments in the field of the pathology and related sciences. A brief outline of what is expected to be learnt during each of the postings in the different sections/laboratories during the MD Course will be given under each head.

2.1. Surgical Pathology

2.1.1. Knowledge

2.1.1.1. The student should be able to demonstrate understanding of the histogenetic and patho-physiologic processes associated with various lesions during discussions with colleagues, clinicians, students and patients.

2.1.1.2. Should be able to identify problems in the laboratory and offer viable solutions.

2.1.2. Skills

2.1.2.1. Given the clinical and operative data, the student should be able to identify, and systematically and accurately describe the chief gross anatomic alterations in the surgically removed specimens.

- 2.1.2.2. Training in the performance of the examination, description and macroscopic sampling of surgical and biopsy specimens (the grossing) so as to be able to perform a systematic gross examination of the tissues including the taking of appropriate tissue sections and in special cases as in intestinal mucosal biopsies, muscle biopsies and nerve biopsies.
- 2.1.2.3. Given the relevant clinical, operative and radiological data, the student should be able to identify and systematically and accurately describe the chief histomorphological alterations in the tissue received in the surgical pathology service. He/she should also correctly interpret and as far as possible, correlate with the clinical data to diagnose at least 90% of the routine surgical material received on an average day. He/she should be able to diagnose at least 75% of the classical lesions being commonly encountered in the surgical pathology service without the aid of the clinical data.
- 2.1.2.4. Start the automatic tissue-processing machine and verbally demonstrate his understanding of the principles of its running.
- 2.1.2.5. Process a tissue, make a paraffin block and cut sections of good quality on a rotary microtome.
- 2.1.2.6. Select appropriate blocks to show lesions in relevant planes of section, including using protocols for minimum datasets where relevant
- 2.1.2.7. Handle different types of specimen appropriately according to the degree of clinical urgency
- 2.1.2.8. Stain paraffin sections with at least the following:
- i) Haematoxylin and eosin
 - ii) Stains for collagen, elastic fibers and reticulin
 - iii) Iron stain
 - iv) PAS stain
- 2.1.2.9. Demonstrate understanding of the principles of:
- i) Fixation of tissues
 - ii) Processing of tissues for section cutting
 - iii) Section cutting and maintenance of related equipment
 - iv) Differential (Special) stains and their utility
- 2.1.2.10. Cut a frozen section of tissues received from the operating room for quick diagnosis, stain and interpret the slide in correlation with the clinical data provided, and correctly diagnose at least 75 per cent of the lesions within 15 minutes.
- 2.1.2.11. Demonstrate the understanding of the utility of various immunohistochemical stains especially in the diagnosis of tumour subtypes.
- 2.1.2.12. Practice in writing histopathology reports including advice on their content and composition
- 2.2. Autopsy Pathology
- 2.2.1. Knowledge
- 2.2.1.1. Should be aware of the technique of autopsy
- 2.2.1.2. Should have sufficient understanding of various disease processes so that a meaningful clinico-pathological correlation can be made.

2.2.2. Skills

- 2.1.1.1. Demonstrate ability to perform a complete autopsy independently with some physical assistance, correctly following the prescribed instructions. Correctly identify all major lesions which have caused, or contributed to, the patient's death on macroscopic examination alone in at least 90% of the autopsies in an average teaching hospital. In exceptional circumstances, help of a frozen section may be obtained.
- 2.1.1.2. Identify and correctly diagnose at least 90% of the microscopic lesions found in most autopsies, and be able to correlate the pathologic changes with the patient's clinical history and events of a few days preceding death.
- 2.1.1.3. Write correctly and systematically Provisional and Final Anatomic Diagnosis reports (on gross and microscopy respectively), the major findings at autopsy, and the Autopsy Protocol as per prescribed instructions, of a standard fit for an international journal.

2.2. Cytopathology

2.2.1. Knowledge

- 2.2.1.1. Should possess the background necessary for the evaluation and reporting of cytopathology specimens.
- 2.2.1.2. Demonstrate verbal familiarity with, and guide the clinical residents in the following, keeping in view the special requirements of each case (Cytohormonal status, malignancy, infection, etc.)
- i) Choice of site from which smears may be taken (as in the case of vaginal smears)
 - ii) Method of obtaining various specimens (urine sample, gastric smear, bronchial lavage etc.)

2.2.2. Skills

- 2.2.2.1. Independently prepare and stain good quality smears for cytopathologic examination and be conversant with the principles and preparation of solutions of stains.
- 2.2.2.2. Demonstrate conversance with the techniques for concentration of specimens: i.e. various filters and cytocentrifuge.
- 2.2.2.3. Independently be able to perform fine needle aspiration of palpable superficial lumps in patients; make good quality smears, and be able to decide on the type of staining in a given case.
- 2.2.2.4. Given the relevant clinical data, he/she should be able to independently and correctly:
- i) Evaluate hormonal status in all cases as may be required.
 - ii) Diagnose the status of malignancy or otherwise in at least 75% of the cases received in a routine laboratory and categorize them into negative, inconclusive and positive.
 - iii) Demonstrate ability in the technique of screening and dotting the slides for suspicious cells
 - iv) Identify the difference between normal cells in common diagnostic cytology specimens (breast fine needle aspirations (FNAs), sputum, bronchial brushings, serous effusions, urine) and typical examples of malignancy.

- v) Indicate correctly the type of tumour, if present, in at least 75% cases
- vi) Identify with reasonable accuracy the presence of organisms, fungi and parasites in atleast 75% of cases.

2.3. Haematology

2.3.1. Knowledge

- 2.3.1.1. Should demonstrate the capability of utilizing the principles of the practice of Haematology for the planning of tests, interpretation and diagnosis of diseases of the blood and bone marrow.
- 2.3.1.2. Should be conversant with various equipments used in the Haematology laboratory
- 2.3.1.3. Should have knowledge of automation and quality assurance in Haematology.

2.3.2. Skills

- 2.3.2.1. Correctly plan a strategy of investigations of the cases referred for special investigations in the Hematology Clinic and give ample justification for each step in consideration of the relevant clinical data provided.
- 2.3.2.2. Correctly and independently perform the following special tests, in addition to doing the routine blood counts :
 - i) Haemogram including Reticulocyte and Platelet counts
 - ii) Bone marrow staining including stain for iron
 - iii) Blood smear staining
 - iv) Cytochemical characterization of leukemia with special stains like Peroxidase, Leukocyte Alkaline Phosphatase (LAP), PAS, Sudan Black, Oil Red O, Acid Phosphatase (including Tartarate resistant) and Non-specific esterase
 - v) Osmotic fragility
 - vi) Fetal Haemoglobin
 - vii) Sickling phenomenon
 - viii) Bleeding time
 - ix) Clotting time
 - x) Prothrombin time (PT)
 - xi) Activated partial thromboplastin time (APTI)
 - xii) Haemoglobin electrophoresis
 - xiii) Coombs Test
 - xiv) Clot Solubility Test

5.3.2.3. Demonstrate familiarity with the principle and utility in diagnosis of the following :

- i) Red cell indices
- ii) Plasma haemoglobin
- iii) Haemosiderin in urine
- iv) Presumptive tests for complete antibodies
- v) Ham's Acid test
- vi) Serum electrophoresis
- vii) Platelet function tests including platelet aggregation and adhesion and PF₃ release
- viii) Russell's viper venom time (RVVT)

- ix) Coagulation Factor assays
 - x) Screening for coagulation factor inhibitors
 - xi) Fibrin Degradation Products (FDP), D-Dimers
 - xii) Monitoring of anticoagulant therapy
 - xiii) Tests for thrombosis : Lupus anticoagulant (LAC), Anticardiolipin Antibody (ACA), Activated Protein C Resistance (APCR), Protein C (Pr C),
 - xiv) Serum ferritin
 - xv) Serum iron and total iron binding capacity
 - xvi) Immunophenotyping
 - xvii) Cytogenetics
- 2.3.2.4. Demonstrate verbally and in writing, his/her under-standing of the principles of the above tests, their utility in diagnosis and interpretation of results.
- 2.3.2.5. Perform a successful bone marrow aspiration/iliac crest biopsy and stain the peripheral and bone marrow smears with Romanowsky stains.
- 2.3.2.6. Describe accurately the morphologic findings in the peripheral blood and bone marrow smears, identifying and quantitating the morphologic abnormalities in disease states and arriving at a correct diagnosis in at least 90% of the case referred to the Haematology laboratory, given the relevant clinical data.
- 2.3.2.7. Posses working knowledge of the following :
- i) Bone marrow transplantation
 - ii) Prenatal diagnosis of genetic haematological diseases
 - iii) Molecular biology of haematological diseases
 - iv) Automated blood cell counter
- 2.4. Laboratory Medicine
- 2.4.1. Knowledge
- 2.4.1.1. Demonstrate familiarity with the normal range of values of the chemical content of body fluids, significance of the altered values and interpretation thereof.
- 2.4.1.2. Possess knowledge of the principles of following specialized organ function tests and the relative utility and limitations of each and significance of the altered values.
- i) Renal function test
 - ii) Liver function test
 - iii) Gastric and Pancreatic function
 - iv) Endocrine function test
 - v) Tests for malabsorption
- 2.4.1.3. Explain the biochemical principles involved in the above estimations.
- 2.4.1.4. Know the principles, advantages and disadvantages, scope and limitation of Automation in laboratory.
- 2.4.1.5. Learn the principles and methodology of quality control in laboratory.
- 2.4.2. Skills
- 2.4.2.1. Plan a strategy of laboratory investigation of a given case, given the relevant clinical history and physical findings in a logical sequence, with a rational explanation of each

step. He should be able to correctly interpret the laboratory data of such studies, and discuss their significance with a view to arrive at a diagnosis.

2.4.2.2. Demonstrate familiarity with and successfully perform a routine Urinalysis including Physical, Chemical and Microscopic, examination of the sediment.

2.4.2.3. Demonstrate familiarity with and successfully perform the macroscopic and microscopic examination of faeces and identify the ova and cysts of common parasites.

2.4.2.4. Independently and successfully perform a complete examination; physical, chemical and cell content of Cerebrospinal Fluid (C.S.F.), Pleural and Peritoneal fluid.

2.4.2.5. Successfully perform an examination of Peripheral Blood for the commonly occurring parasites.

2.4.2.6. Demonstrate familiarity with and successfully perform a Semen analysis.

2.4.2.7. Demonstrate familiarity with the following Quantitative Estimations by Automated/ Manual Techniques and interpretation of normal versus abnormal values.

- I. Blood urea
- II. Blood sugar
- III. Serum Proteins total & fractional
- IV. Serum Bilirubin total & fractional
- V. Serum cholesterol
- VI. Uric acid
- VII. Serum Transaminases (ALT and AST/SGOT and SGPT)
- VIII. Serum Alkaline Phosphatase
- IX. Creatinine
- X. Serum Electrolyte (NA⁺ and K⁺)

2.4.2.8. Demonstrate familiarity with :

- i) Determination of bicarbonates
- ii) Blood gas analysis

2.4.2.9. Prepare standard normal solution, molar solution and Buffers.

2.4.2.10. Explain the principle of Instrumentation, use and application of the following instruments.

- i) Photoelectric colorimeter
- ii) Spectrophotometer
- iii) pH meter
- iv) Flame photometer
- v) Centrifuge
- vi) Analytical balance
- vi) Electrophoresis apparatus
- viii) Light Microscope
- ix) Blood gas analyzer

2.5. Transfusion Medicine (Blood Banking)

2.5.1. Knowledge It is expected that students should possess knowledge of the following aspects of Transfusion Medicine.

2.5.1.1. Basic immunology

2.5.1.2. ABO and Rh groups

2.5.1.3. Clinical significance of other blood groups

2.5.1.4. Transfusion therapy including the use of whole blood and RBC concentrates

2.5.1.5. Blood component therapy

2.5.1.6. Rationale of pre-transfusion testing.

2.5.1.7. Infections transmitted in blood.

2.5.1.8. Adverse reactions to transfusion of blood and components

2.5.1.9. Quality control in blood bank

2.5.2. Skills

It is expected that the student shall correctly and independently perform the following.

2.5.2.1. Selection and bleeding of donors

2.5.2.2. Preparation of blood components i.e. Cryoprecipitates, Platelet concentrate, Fresh Frozen Plasma, Single Donor Plasma, Red Blood Cell concentrates.

2.5.2.3. ABO and Rh grouping

2.5.2.4. Resolving ABO grouping problems by secretor status in saliva and expanded panel

2.5.2.5. Demonstrate familiarity with Antibody screening by

- i) LISS (Low-ionic salt solution)
- ii) Enzymes
- iii) AHG (Anti-Human Globulin)

2.5.2.6. Steps to be taken if the above are positive

2.5.2.7. Demonstrate familiarity with Crossmatching by

- i) LISS (Low-ionic salt solution)
- ii) Enzymes
- ii) AHG (Anti-Human Globulin)

2.5.2.8. Steps to be taken if there is incompatibility

2.5.2.9. Demonstrate familiarity with Antenatal and Neonatal work

- i) Direct antiglobulin test
- ii) Antibody screening and titre
- iii) Selection of blood for exchange transfusion

2.5.2.10. Demonstrate familiarity with principle and procedures involved in

- i) Resolving ABO grouping problems
- ii) Identification of RBC antibody
- iii) Investigation of transfusion reaction
- iv) Testing of blood for presence of
 - a) HBV (Hepatitis B Virus Markers)
 - b) HCV (Hepatitis C Virus Markers)
 - c) HIV (Human Immunodeficiency Virus Testing)
 - d) VDRL

2.6. Basic Sciences (in relation to Pathology)

2.6.1. Immunopathology

2.6.1.1. Knowledge

- i) Demonstrate familiarity with the current concepts of structure and function of the immune system, its aberrations and mechanisms thereof.
- ii) Demonstrate familiarity with the scope, principles, limitations and interpretations of the results of the following procedures employed in clinical and experimental studies relating to immunology.
- iii) ELISA techniques
- iv) Radioimmuno assay
- v) HLA typing

2.6.1.2. Skills

- i) Perform and interpret simple immunological tests used in diagnosis of diseases and in research procedures, subject to the availability of facilities
 - a) Immunoelectrophoresis
 - b) Immunofluorescence techniques especially on kidney and skin biopsies
 - c) Countercurrent electrophoresis for demonstration of antigen
 - d) Latex agglutination
 - e) Anti-nuclear Factor (ANF)
 - f) Anti-neutrophil cytoplasmic antibody (ANCA)

2.6.2. Electron Microscopy

2.6.2.1. Knowledge

i) Demonstrate familiarity with Principles and techniques of electron microscopy and the working of an electron microscope (including Transmission and Scanning Electron microscopy: TEM and SEM)

2.6.2.2. Skills

- i) Should be conversant with the technique of proper fixation, processing and staining of tissues for electron microscopy, subject to the availability.
- ii) Recognize the appearance of the normal subcellular organelles and their common abnormalities (when provided with appropriate photographs).

2.6.3. Enzyme Histochemistry

2.6.3.1. Knowledge Should be familiar with the principles, use and interpretation of common enzyme histochemical procedures (Alkaline Phosphatase, Acid Phosphatase, Glucose-6-Phosphate Dehydrogenase, Succinyl Dehydrogenase, Chloroacetate Esterase, Gammaglutamyl Transpeptidase and Acetyl Cholinesterase etc).

2.6.3.2. Skills

- i) Operate the cryostat and demonstrate familiarity with the principles of its working and be able to stain tissue sections for some cell constituents.
- ii) Demonstrate familiarity with the commonly used enzyme histochemical procedures.

2.6.4. Immunohistochemistry

2.6.4.1. Knowledge

Demonstrate familiarity with the principles and exact procedures of various immunohistochemical stains using appropriate systems; employing monoclonal and polyclonal antibodies.

2.6.4.2. Skills

Be able to perform immunohistochemical staining using paraffin section with at least one of the commonly used antibodies using appropriate system as available.

2.6.5. Molecular Biology

2.6.5.1. Knowledge

Should understand the principles of Molecular biology especially related to the understanding of disease processes and its use in various diagnostic tests.

2.6.5.2. Skills

Should be conversant with the steps of a Polymerase Chain Reaction (PCR) and should demonstrate understanding of the steps and principles of interpretation of Western Blot, Southern Blot, Northern Blot and Hybridisation procedures.

2.6.6. Principles of Medical Statistics

2.6.6.1. Knowledge

Demonstrate familiarity with importance of statistical methods in assessing data from patient material and experimental studies e.g., correlation coefficients, expected versus observed, etc. and their interpretation.

2.6.6.2. Skills

Calculate mean, standard deviation and standard error, sensitivity and specificity from the given experimental data.

2.6.7. Radio Isotope and Autoradiography, Tissue Culture, Cytogenetics

2.6.7.1. Knowledge

2.6.7.1.1 Demonstrate familiarity with the principles of the commonly used radioisotopes in medicine and autoradiography, and the instruments used to measure radioactivity, techniques of tissue culture

2.6.7.1.2. Demonstrate familiarity with methods of Karyotyping and Fluorescent in-situ Hybridisation (FISH).

3. RESEARCH

All effort must be made so that awareness of research methodology is apparent at the end of the course. It is recommended that students submit a Thesis or Dissertation six months prior to examinations as a partial fulfillment to the award of the degree of MD (Pathology). Students should be encouraged to present papers in conferences and publish papers in peer reviewed journals. Due emphasis must be laid on the importance of obtaining ethical clearance from appropriate committees for both animal and human studies.

A separate course for training in research methodology may not be necessary. Skills will be acquired largely depending on the topic of research. The following points are guidelines to what may be expected of the student at the end of the course.

- 3.1. Recognise a research problem – basic or applied
- 3.2. Clearly state the objectives in terms of what is expected to be achieved in the end
- 3.3. Plan rational approaches with appropriate controls with full awareness of the statistical validity of the size of experimental material
- 3.4. Carry out most of the technical procedures required for the study
- 3.5. Accurately and objectively record on systematic lines the results and observations made
- 3.6. Analyse the data with the aid of an appropriate statistical analysis, if necessary
- 3.7. Interpret the observations in the light of existing knowledge and highlight in what ways the study has advanced existing knowledge on the subject and what further remains to be done.
- 3.8. Take photomicrographs, of a quality fit for publication in an international journal
- 3.9. Write the thesis or a scientific paper in accordance with the prescribed instructions, as expected of international standards.

4. TRAINING METHODS

Diagnostic pathology is concerned with the application of the knowledge of the human body and its diseases, and that of the investigative procedures in the recognition and quantitation of disease. In the training of a pathologist, acquisition of both these disciplines is essential. Eventually, the primary role of the pathologist is to apply the basic understanding of the disease processes to patient care, with the intellectual rigor and careful delineation of problems, characteristic of a research investigator. The training

programme should be designed to enable the student to acquire a capacity to learn and investigate for himself, to synthesize and integrate a set of facts and develop a faculty to reason. The curricular programmes and scheduling of postings must provide the student with opportunities to embrace the above broad objectives. Much of the learning is to be accomplished by the student himself. Interactive discussions are to be preferred over didactic sessions. The student must blend as an integral part of the activities of an academic department that usually revolves around three equally important basic functions of teaching, research and diagnostic service. As mentioned earlier the emphasis is recommended under a residency programme or learning while serving/working. The following is a rough guideline to various teaching/learning activities that may be employed.

- 4.1. Collection of specimens including blood and bone marrow, fine needle aspiration of superficial lumps etc.
- 4.2. Grossing of specimens.
- 4.3. Performing autopsies.
- 4.4. Discussions during routine activities such as during signing out of cases.
- 4.5. Presentation and work-up of cases including the identification of special stains and ancillary procedures needed.
- 4.6. Clinico-pathological conferences.
- 4.7. Intradepartmental and interdepartmental conferences related to case discussions.
- 4.8. Conferences, Seminars, Continuing Medical Education (CME) Programmes.
- 4.9. Journal Club.
- 4.10. Research Presentation and review of research work.
- 4.11. Guest and in-house lectures.
- 4.12. Participation in workshops, conferences and presentation of papers etc.
- 4.13. Laboratory-work.
- 4.14. Use and maintenance of equipment.
- 4.15. Maintenance of records.
- 4.16. Teaching undergraduates and paramedical staff.

5. STRUCTURED TRAINING PROGRAMME

A structured scheme of training is recommended so that every student is exposed to different aspects of the subject and acquires sufficient knowledge and skill as expected from the course. The method by which this is done may vary from institution to institution.

However, it is suggested that one senior member of the faculty be given the chief responsibility for organizing and coordinating this programme and any enquires may be made or assistance taken, if necessary, from him/her. The three-year training programme for the M.D. degree may be arranged in the form of postings to different assignments/laboratories for specified periods as outlined below. The period of such assignments/postings is recommended for 35 months, leaving the final month for the purpose of examination. Posting schedules may be modified depending on needs,

feasibility and exigencies. It is appreciated that individual institutions may find it convenient to follow a different pattern of posting.

Section / Subject Duration in months

- | | |
|--|---------|
| i) Haematology | 9 month |
| ii) Cytopathology | 6 month |
| iii) Thesis/Dissertation Work | 2months |
| iv) Laboratory Medicine/ Central lab | 2months |
| v) Transfusion Medicine/Blood Bank | 2months |
| vi) Surgical Pathology and Autopsy | 1 month |
| vii)Basic Sciences including Immunopathology,
Electronmicroscopy, Molecular Biology,
Research Techniques, biochemistry etc.
plus Elective/reorientation | 2months |

ASSESSMENT:-

General Principles

- The assessment should be valid, objective, and reliable.
- It must cover cognitive, psychomotor and affective domains.
- Formative, continuing and summative (final) assessment should be conducted in theory as well as practicals/clinicals. In addition, thesis should be assessed separately.

Overall Weightage

Internal assessment - 20%

Final summative examination - 80%

Formative assessment

The formative assessment should be continuous as well as end-of-term. The former should be based on the feedback from the senior residents and the unit faculty concerned. End-of-term assessment should be held at the end of each semester (upto the 5th semester). Formative assessment will not count towards pass/fail at the end of the program, but will provide feedback to the candidate. Scheme of internal assessment examination It is held by means of a written test and practical (and or clinical) with viva examination by all consultants of the department as per distribution of marks as follows. In such five six monthly tests a candidate shall be evaluated for 1000 marks in total i.e. 200 marks in each term as follows.

Item	1st term	2nd term	3rd term	4th term	5th term
Theory	75 marks	75 marks	75 marks	75 marks	75 marks
Oral, Practical/clinical	75 marks	75 marks	75 marks	75 marks	75 marks
Log book evaluation	50 marks	50 marks	50 marks	50 marks	50 marks
Total	200 marks	200 marks	200 marks	200 marks	200 marks
Gross total	1000 marks				
Carried forward to Final MD/MS Examination	20 % marks ~ 200 marks				

200 marks shall be carried over a period of five terms as follows.

- Log book evaluation- 10 x 5terms= 50 marks
- Theory exam 15 x 5terms= 75 marks
- Oral ,Practical/Clinical exam 15 x 5terms= 75 marks

Evaluation of the Log book:

Each candidate should be required to maintain a log book in which following details will be entered and evaluated on a scale of 1 to 10. At end of each term of 6months of training for 5such terms the logbook will be evaluated and a score is to be calculated out from a maximum of 100 marks for the 10 items as entered in the logbook.

- i. skills learned independently, under supervision or assisted by him. 1 to 10
- ii. Presentations in journal clubs 1 to 10.
- iii. Cases presented in clinical meetings 1 to 10
- iv. Presentation in departmental seminars..... 1 to 10
- v. Intra and interdepartmental training and evaluation details.....1 to 10
- vi. Teaching activities.....1 to 10
- vii. Conferences/workshops/CME attended 1 to 10
- viii. Papers presented/published conferences.....1 to 10
- ix. Didactic lectures attended.....1 to 10
- x. Thesis progress and evaluation details.....1 to 10

MD Examination:

Pattern of question for theory Papers- There shall be four theory papers. One paper out of these shall be on ‘Basic Medical Sciences’ and one paper on ‘Recent Advances’ in the discipline. There shall be 100 marks for each paper to be answered in 3 hours’ time. There shall be ‘1 structured essay type question’ for 20 marks besides 8‘short essay type questions’ for 10 marks each in each paper.

Days of practical examination-Practical Examination should be conducted for a batch of upto 8 candidates over a minimum period of two to three days extendable up to 7days subject to the subject curriculum with due approval of the board of examiners. For a batch of more than 8 the examination may extend accordingly. The

theory papers shall be evaluated at the examination center itself before commencement of the practical/clinical and oral examination in the subject during these practical examination days.

Components of examination-It consist of a written examination, a practical examination to assess the clinical/practical competencies and skills, and a viva voce examination.

The examinations shall consist of

- A) theory
- B) practical including clinical
- C) oral

A.Theory-

The 4 papers in theory shall be conducted well in advance before the oral , clinical/practical examination.

B. Practical

Clinical/Practical examination is the most important part of the evaluation and is aimed at assessing the clinical/practical skills of the candidate and diagnostic reasoning. Entirely objective evaluation of these skills is neither feasible nor desirable. However, in order to test the various skills, the examiners may evaluate the candidates on a structured format.

C. Pedagogic Skill

The candidate shall be allotted a topic from the discipline at a short notice of few hours, (preferably on the first day of the examination) to prepare and present before the board of examiners within a time span of 15 minutes (preferably on the second day of the examinations) . The teaching skill will be evaluated under various points(as illustrated below) and marks given accordingly.

- (i) Choice of article/topic (unless specifically allotted)
- (ii) Completeness of presentation
- (iii) Clarity of presentation
- (iv) Understanding of the subject and ability to convey the same
- (v) Whether relevant references have been consulted
- (vi) Ability to convey points in favour and against the subject under discussion
- (vii) Use of audio-visual aids

- (viii) Ability to answer questions
- (ix) Time scheduling
- (x) Overall performance

D. Viva-Voce

a.Viva-voce is expected to be conducted at every stage of the practical examination. The resident will be required to answer oral questions on any aspect of the specialty. Oral examination is designed to test the general scientific background of the candidate and his/her own particular contribution embodied by the thesis. A formal "grand viva-voce" may be held at the end of the practical examination. Questions on the thesis/dissertation may be asked at this time as well. The board of examiners will conduct the examination. They will read out the comments & questions and will seek the answers from the candidate. The viva voce should be assessed under the following headings:

- 1. Thesis viva voce
- 2. Grand viva voce

All examiners shall be jointly responsible for all parts of the examination. In presence of the external examiners, the Chairman of the conducting board shall make the necessary arrangements for conducting the oral and practical including clinical examination at the department in the college centre .

b. The candidate shall bring the logbook and a copy of his/her thesis mandatorily while appearing for the oral, practical and clinical examination.

Marks for examinations: The examinations shall be organized on the basis of marking system to evaluate and certify candidate's level of knowledge, skill and competence as per distributions mentioned below. In total the overall assessment for a postgraduate shall be for 1000 marks distributed as follows.

A. Internal assessment exam(200 marks)

- Theory 15x5=75
- Practical (Oral, clinical and practical) 15x5=75
- Log book evaluation 10x5=50
- Total : 40x5=200

B. Final MD/MS exam (800 marks)

- Theory (100 x 4 Papers) 400
- Oral ,Clinical/Practical 400
 - I) Clinical/Practical (300 marks)
 - Long exercise (one) 80 marks
 - Short exercise (three) 120 marks

OSPE(ten)		40 marks
Spots(ten)		40 marks
Pedagogic skill		20 marks
II) Viva		(100 marks)
Thesis Viva		20 marks
Grand Viva		80 marks
Grand Total	(A+B)=	1000 marks

PASS/FAIL- In order to pass the examination in each subject a candidate must secure not less than 50% marks in each head of passing which shall include (1) Theory (2) Practical including clinical and viva voce examination (3) internal assessment examination.

Plan of MD/MS Examination:-

The PG examination shall be carried out in three parts:-

1.Theory :-

- There shall be 4 papers with 100 marks for 3hours duration of examination each.
- There shall be 1 structured essay type questions for 20 marks along with 8 short answer type questions for 10 marks each in each paper.
- The chapter distribution for the papers shall be as follows.

paper-I : general pathology,immunopathology,pathophysiology.

paper-II : systemic pathology ,cytopathology

paper-III : hematology,transfusion medicine(blood banking),laboratory medicine.

paper-IV : applied pathology,recent advances

2.Practical Examination should be conducted over a minimum period of two days and a maximum of three days.

The following is a guideline of the aspects to be covered:

i) A. Clinical Pathology: Discussion of a clinical case history plan relevant investigations of the above case. One relevant investigations should be performed/result interpreted.

B. Complete urinalysis

ii) Haematology : Discuss haematology cases given the relevant history Plan relevant investigations Perform atleast two tests: one routine and one special exercise. Identify electrophoresis strips, osmotic fragility chart etc. Examine, report and discuss ten cases given the history and relevant blood smears and/or bone marrow aspirate smears.

iii) Transfusion (Medicine): Perform blood grouping. Perform the necessary exercise given a relevant history

iv) Histopathology (Cytopathology): Examine, report and discuss ten to twelve histopathology and three to five cytopathology cases given the relevant history and slides. Perform a Haematoxylin and Eosin stain and any special stain on a paraffin section Report on a frozen section

v) Autopsy: Given a case history and relevant organs (with or without slides) give a list of anatomical diagnosis in a autopsy case.

vi) Gross Pathology : Describe findings of at least 10 gross specimens, give diagnosis and identify the sections to be processed

vii) Basic Sciences : Identify electronmicrographs, Identify gels, results of PCR, immunological tests including staining for direct/indirect immunofluorescence, Identify histochemical and immunohistochemistry stains

3. Viva-voce is expected to be conducted at every stage of the practical examination. Additionally a formal “grand” viva-voce may be held at the end of the practical examination. Questions on the thesis/dissertation may be asked at this time.

MODEL QUESTION PAPERS

MD Degree Examination – Branch III – Pathology

Paper I

General Pathology, Pathophysiology and Immunopathology

Time 3 hours

Max Marks 100

1. Give an account of immune reactions to transplant organs and tissues. (20)
2. Discuss the role of mast cells in health and disease. (10)
3. Write briefly on: (8x10=80)
 - a) Aetiopathogenesis of edema
 - b) Molecular basis of metastasis
 - c) Leucotrienes in inflammation
 - d) Langerhans cells
 - e) Radiation induced carcinogenesis

MD Degree Examination – Pathology

Paper II

Systemic Pathology including Cytopathology

Time 3 hours Max

Marks 100

1. Discuss the pathology and diagnosis of gestational trophoblastic disease. (20)
2. Discuss the role of cytology in the diagnosis of salivary gland tumors. (10)
3. Write briefly on:
 - a) Childhood renal tumors
 - b) Prostatic intraepithelial neoplasm
 - c) Myasthenia gravis
 - d) Primary Biliary Cirrhosis
 - e) Body cavity lymphoma (8x10=80)

MD Degree Examination –Pathology

Paper III

Haematology, Transfusion Medicine (Blood Banking)and Laboratory Medicine

Time 3 hours Max

Marks 100

1. Discuss your approach to a patient with hemorrhagic diathesis. (20)
2. Discuss the haematological sequelae of infection with Human Immunodeficiency Virus-type 1 (HIV-1) (10)
3. Write briefly on: (8 x10=80)
 - a) Chromosomal anomalies in leukemia
 - b) Alpha thalassemia
 - c) Laboratory evaluation of iron deficiency anemia
 - d) Rational use of blood components
 - e) Liquid based cytology for cervical screening

MD Degree Examination – Branch III – Pathology

Paper IV

Recent Advances and Applied aspects

Time 3 hours Max

Marks 100

1. Discuss the role of immunopathology in the diagnosis of kidney diseases. (20)
2. Discuss the current concepts in the pathology of Hodgkin lymphoma. (20)
3. Write briefly on: (6x10 =60)
 - a) Tissue microarray
 - b) Lectins in diagnostic pathology
 - c) Premalignant endometrial lesions
 - d) Pathology of Barrett esophagus
 - e) Matrix metalloproteinases in neoplastic proliferation

The question paper may be formed in such a way so as to elicit precise information. The questions should be less open ended and strive to evaluate the approach to a disease entity, recent concepts and not mere theoretical rote knowledge.

JOURNALS AND PERIODICALS

- . Acta Cytologica
- . The American Journal of Pathology
- . The American Journal of Surgical Pathology
- . The American Journal of Hematology
- . The American Journal of Clinical Pathology
- . Archives of Pathology and Laboratory Medicine
- . British Journal of Haematology

- . Blood
- . Diagnostic Cytopathology
- . Histopathology
- . Human Pathology
- . Indian Journal of Cytology
- . Indian Journal of Pathology and Microbiology
- . Journal of Pathology
- . Journal of Clinical Pathology
- . Laboratory Investigation
- . Modern Pathology
- . Pathology
- . Seminars in Hematology
- . Seminars in Diagnostic Pathology
- . Virchows Archives
- . Year Book Series
- . Recent Advances Series

The list of journals is incomplete. It is also expected that the students make it a habit to read other journals because pathology is not confined to pathology journals alone. Specialty journals such as those related to oncology (Cancer, British Journal of Cancer, International Journal of Cancer, Cancer Research, Journal of National Cancer Institute, Journal of Surgical Oncology etc.) are excellent sources of information regarding the pathology of tumours. Similarly journals related to Cardiology, Chest Diseases, Dermatology, Endocrinology, Gynecology, Gastroenterology, Hepatology, Nephrology, Neurology, Neurosurgery, etc. are invaluable sources of material on the appropriate pathology. Further Journals such as Lancet, New England Journal of Medicine, Nature and Science are a must for every postgraduate student who wishes to keep abreast with what is new in medical science and therefore in pathology.

BOOKS

- . Histology for Pathologists. Stephen S. Sternberg (Ed), Raven Press, New York.
- . General Pathology JB Walter, MS Israel. Churchill Livingstone, Edinburgh.
- . Robbin's Pathologic Basis of Disease Ramzi S. Cotran, Vinay Kumar, Stanley L Robbins WB Saunders Co., Philadelphia.
- . Pathology Emanuel Rubin, John L Farber. JB Lippincott Co., Philadelphia.
- . Anderson's Pathology. John M Kissane (Ed). The CV Mosby Co., St. Louis
- . Ackerman's Surgical Pathology. Juan Rosai Mosby. St. Louis
- . Diagnostic Surgical Pathology. Stephen S Sternberg. Lippincott, William Wilkins. Philadelphia
- . Systemic Pathology. W St. C Symmers (Series Ed) Churchill Livingstone, Edinburgh

- . Diagnostic Histopathology of Tumours. Christopher DM Fletcher (Ed). Churchill Livingstone. Edinburgh.
- . Soft Tissue Tumors. Franz M Enzinger, Sharon W Weiss. Mosby, St. Louis
- . Cardiovascular Pathology Malcolm D Silver Churchill Livingstone New York.
- . Pathology of Pulmonary Diseases Mario J Saldhana. JB Lippincott Co., Philadelphia
- . Spencer's Pathology of the Lung. PS Hasleton. Mc Graw-Hill, New York.
- . Dahlin's Bone Tumors. K Krishnan Unni. Lippincott-Raven Publishers, Philadelphia, New York
- . Bone Tumours Andrew G Huves WB Saunders Co. Philadelphia
- . Greenfield's Neuropathology. J Hume Adams (Ed) Edward Arnold, London.
- . Russel & Rubenstein's Pathology of the Tumours of the Nervous System. Darrell D Bigna Roger E Mc Lendon, Janet M Bruner (Eds.), Arnold, London.
- . Rosen's Breast Pathology. Paul Peter Rosen. Lippincott-Raven Publishers, Philadelphia. New York.
- . Pathology of the Gastrointestinal Tract. S-I Chun Ming. Harvey Goldman (Eds.)Williams & Wilkins, Baltimore.
- . Haynes and Taylor Obstetrical & Gynaecological Pathology. H Fox, M Wells. Churchill Livingstone New York.
- . Heptinstall's Pathology of the Kidney. J Charles Jenetie, Jean L. Olson, Melvin M Schwart Fred G Silva (Eds). Lippincott-Raven Publishers, Philadelphia, New York.
- . Potter's Pathology of the Fetus & Infant. Enid Gilbert-Barnes (Ed). Mosby, St. Louis
- . Lever's Histopathology of the Skin, David Elder (Ed), Lippincott-Raven Publishers, Philadelphia, New York.
- . Theory and Practice of Histological Techniques, Bancroft JD, Stevens A, Turner DR, Churchill Livingstone, Edinburgh
- . Histotechnology – A Self Instructional Text, Carson FL, American Society of Clinical Pathologists, Chicago.
- . Histochemistry Theoretical and Applied. AG Everson Pearse. Churchill Livingstone. Edinburgh.
- . Manual & Atlas of Fine Needle Aspiration Cytology. Svante R Orell, Gregory F Sterrett, Max N. J. Walters, Darrel Whitaker: Churchill Livingstone, London.
- . Cytopathology. Zuher M Zaib. Little Brown and Company, Boston.
- . Diagnostic Cytology and its Histopathologic Basis, Koss LG, J.B. Lippincott, Philadelphia
- . Comprehensive Cytopathology, Bibbo M, W.B. Saunders Co, Philadelphia.
- . William's Hematology Beutler E, Lichtmann MA, Coller BS, Kipps TJ, McGraw Hill, New York.
- . Postgraduate Hematology Hoffbrand AV, Lewis SM, Tuddenham EGD, Butterworth Heinemann, Oxford.
- . Wintrobe's Clinical Hematology, Lee GR, Foerster J, Lupeus J, Paraskevas F, Gveer JP, Rodgers GN, Williams & Wilkins, Baltimore.

- . Practical Haematology, Dacie JV, Lewis SM, Churchill Livingstone, Edinburgh
- . Bone Marrow Pathology, Bain BJ, Clark DM, Lampert IA, Blackwell Science, Oxford
- . Leukemia Diagnosis-A guide to the FAB Classification, Bain BJ, J.B. Lippincott, Philadelphia.
- . Clinical Diagnosis and Management by Laboratory Methods, Henry JB, WB Saunders. (Indian Edition, Eastern Press, Bangalore).

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**Syllabus and Curriculum
for
MD – PHARMACOLOGY
2012**

Programme Objectives :

A candidate upon successfully qualifying in the M.D. (Pharmacology) examinations should be able to -

1. Teach pharmacology and therapeutics to students of medical and allied disciplines.
2. Independently plan and undertake research related to drugs (basic as well as Clinical Pharmacology) and communicate the findings in conferences/journals.
3. Set up therapeutic drug monitoring, ADR monitoring, therapeutic audit and drug information services.
4. Plan and conduct toxicity studies and clinical trials
5. Educate the public about use and misuse of drugs.
6. Supervise breeding and upkeep of small laboratory animals.
7. Act as medical advisor in a pharmaceutical house.

Specific Learning Objective

1. Demonstrate sound knowledge of general pharmacological principles, systemic pharmacology and rational use of drugs.
2. Plan and conduct lecture, demonstration, practical and tutorial classes for students of medical and allied disciplines.
3. Understand the principles of essential drug concept and rational use of drugs including rational pharmacotherapy .
4. Carry out screening of drugs for pharmacological and toxicological profile.
5. Carry out drug related literature search, formulate a research project and undertake the same. Apply appropriate statistical methods for summarising and analysing data.
6. Present research findings in conferences (oral/poster sessions), Communicate research/educational papers in peer reviewed journals, Critically review and comment on research papers.
7. Measure drug levels in blood and other biological fluids using suitable chemical assay methods and interpret the same in therapeutic/toxicological context.
8. Monitor adverse drug reactions. Carry out therapeutic audit and provide drug information service to doctors/public.
9. Use computer and IT tools for teaching, research and presentation! publication of data.

10. Demonstrate knowledge of National Health policy, essential drug concept lists and supervise drug management in a hospital.
11. Demonstrate knowledge of drug rules and regulations existing in the country.

Post Graduate Training

Based on the available facilities, department can prepare a list of postgraduate experiments pertaining to basic and applied Pharmacology. Active learning should form the mainstay of postgraduate training there should be lectures for postgraduates (at least 20 per year). alongwith seminars, symposia, group-discussions, Journal clubs. The postgraduate students should regularly the ward rounds of various clinical departments and learn cases of interest for discussion with the Pharmacology faculty. Each college should have a medical education unit to generate teaching resource material for UG and evolving of problem solving modules. Extra departmental rotation-

- | | |
|----------------------------|--------|
| • Drug distribution center | 4weeks |
| • Medicine Ward | 4weeks |
| • Pediatrics Ward | 4weeks |

ASSESSMENT:-

General Principles

- The assessment should be valid, objective, and reliable.
- It must cover cognitive, psychomotor and affective domains.
- Formative, continuing and summative (final) assessment should be conducted in theory as well as practicals/clinicals. In addition, thesis should be assessed separately.

Overall Weightage

Internal assessment - 20%

Final summative examination - 80%

Formative assessment

The formative assessment should be continuous as well as end-of-term. The former should be based on the feedback from the senior residents and the unit faculty concerned. End-of-term assessment should be held at the end of each semester (upto the 5th semester). Formative assessment will not count towards pass/fail at the end of the program, but will provide feedback to the candidate. Scheme of internal assessment examination It is held by means of a written test and practical (and or clinical) with viva examination by all consultants of the department as per distribution of marks as follows. In such five six monthly tests a candidate shall be evaluated for 1000 marks in total i.e. 200 marks in each term as follows.

Item	1st term	2nd term	3rd term	4th term	5th term
Theory	75 marks	75 marks	75 marks	75 marks	75 marks
Oral, Practical/clinical	75 marks	75 marks	75 marks	75 marks	75 marks
Log book evaluation	50 marks	50 marks	50 marks	50 marks	50 marks
Total	200 marks	200 marks	200 marks	200 marks	200 marks
Gross total	1000 marks				
Carried forward to Final MD/MS Examination	20 % marks ~ 200 marks				

200 marks shall be carried over a period of five terms as follows.

- Log book evaluation- 10 x 5terms= 50 marks
- Theory exam 15 x 5terms= 75 marks
- Oral ,Practical/Clinical exam 15 x 5terms= 75 marks

Evaluation of the Log book:

Each candidate should be required to maintain a log book in which following details will be entered and evaluated on a scale of 1 to 10. At end of each term of 6months of training for 5such terms the logbook will be evaluated and a score is to be calculated out from a maximum of 100 marks for the 10 items as entered in the logbook.

- i. skills learned independently, under supervision or assisted by him. 1 to 10
- ii. Presentations in journal clubs1 to 10.
- iii. Cases presented in clinical meetings 1 to 10
- iv. Presentation in departmental seminars..... 1 to 10
- v. Intra and interdepartmental training and evaluation details.....1 to 10
- vi. Teaching activities.....1 to 10
- vii. Conferences/workshops/CME attended 1 to 10
- viii. Papers presented/published conferences.....1 to 10
- ix. Didactic lectures attended.....1 to 10
- x. Thesis progress and evaluation details.....1 to 10

MD Examination:

Pattern of question for theory Papers- There shall be four theory papers. One paper out of these shall be on ‘Basic Medical Sciences’ and one paper on ‘Recent

Advances' in the discipline. There shall be 100 marks for each paper to be answered in 3 hours' time. There shall be '1 structured essay type question' for 20 marks besides 8'short essay type questions' for 10 marks each in each paper.

Days of practical examination-Practical Examination should be conducted for a batch of upto 8 candidates over a minimum period of two to three days extendable up to 7days subject to the subject curriculum with due approval of the board of examiners. For a batch of more than 8 the examination may extend accordingly. The theory papers shall be evaluated at the examination center itself before commencement of the practical/clinical and oral examination in the subject during these practical examination days.

Components of examination-It consist of a written examination, a practical examination to assess the clinical/practical competencies and skills, and a viva voce examination.

The examinations shall consist of

- A) theory
- B) practical including clinical
- C) oral

A.Theory-

The 4 papers in theory shall be conducted well in advance before the oral , clinical/practical examination.

B. Practical

Clinical/Practical examination is the most important part of the evaluation and is aimed at assessing the clinical/practical skills of the candidate and diagnostic reasoning. Entirely objective evaluation of these skills is neither feasible nor desirable. However, in order to test the various skills, the examiners may evaluate the candidates on a structured format.

C. Pedagogic Skill

The candidate shall be allotted a topic from the discipline at a short notice of few hours, (preferably on the first day of the examination) to prepare and present before the board of examiners within a time span of 15 minutes (preferably on the

second day of the examinations) . The teaching skill will be evaluated under various points(as illustrated below) and marks given accordingly.

- (i) Choice of article/topic (unless specifically allotted)
- (ii) Completeness of presentation
- (iii) Clarity of presentation
- (iv) Understanding of the subject and ability to convey the same
- (v) Whether relevant references have been consulted
- (vi) Ability to convey points in favour and against the subject under discussion
- (vii) Use of audio-visual aids
- (viii) Ability to answer questions
- (ix) Time scheduling
- (x) Overall performance

D. Viva-Voce

a. Viva-voce is expected to be conducted at every stage of the practical examination. The resident will be required to answer oral questions on any aspect of the specialty. Oral examination is designed to test the general scientific background of the candidate and his/her own particular contribution embodied by the thesis. A formal "grand viva-voce" may be held at the end of the practical examination. Questions on the thesis/dissertation may be asked at this time as well. The board of examiners will conduct the examination. They will read out the comments & questions and will seek the answers from the candidate. The viva voce should be assessed under the following headings:

1. Thesis viva voce
2. Grand viva voce

All examiners shall be jointly responsible for all parts of the examination. In presence of the external examiners, the Chairman of the conducting board shall make the necessary arrangements for conducting the oral and practical including clinical examination at the department in the college centre .

b. The candidate shall bring the logbook and a copy of his/her thesis mandatorily while appearing for the oral, practical and clinical examination.

Marks for examinations: The examinations shall be organized on the basis of marking system to evaluate and certify candidate's level of knowledge, skill and competence as per distributions mentioned below. In total the overall assessment for a postgraduate shall be for 1000 marks distributed as follows.

A.Internal assessment exam(200 marks)

• Theory	15x5=75
• Practical (Oral, clinical and practical)	15x5=75
• Log book evaluation	10x5=50
Total :	40x5=200

B.Final MD/MS exam (800 marks)

• Theory (100 x 4 Papers)	400
• Oral ,Clinical/Practical	400
I)Clinical/Practical	(300 marks)
Long exercise (one)	80 marks
Short exercise (three)	120 marks
OSPE(ten)	40 marks
Spots(ten)	40 marks
Pedagogic skill	20 marks
II) Viva	(100 marks)
Thesis Viva	20 marks
Grand Viva	80 marks

Grand Total	(A+B)=	1000 marks
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PASS/FAIL- In order to pass the examination in each subject a candidate must secure not less than 50% marks in each head of passing which shall include (1) Theory (2) Practical including clinical and viva voce examination (3) internal assessment examination.

Plan of MD/MS Examination:-

The PG examination shall be carried out in three parts:-

1.Theory :-

- There shall be 4 papers with 100 marks for 3hours duration of examination each.
- There shall be 1 structured essay type questions for 20 marks along with 8 short answer type questions for 10 marks each in each paper.
- The chapter distribution for the papers shall be as follows.

Plan of MD/MS examination :-

The Post Graduate examination shall be in three parts :-

1. Thesis, to be submitted by each candidate at least 6 months before the date of commencement of the theory examination.
2. Theory: There shall be four theory papers.

paper-I : general pharmacological principles and applied sciences.

paper-II : systemic pharmacology, chemotherapy, therapeutics

paper-III : experimental pharmacology, bioassay, statistics.

paper-IV : clinical pharmacology, recent advances.

3. Practicals

Should be spread over two days.

The practical examination should consist of the following:

1. One experimental pharmacology exercise on intact animal
2. One experimental pharmacology exercise on isolated organ
3. One minor procedure exercise
4. One chemical pharmacology exercise
5. One clinical Pharmacology exercise
 - a) Drug related problem solving
 - b) Comment on a paper reporting a clinical trial
 - c) Comment on a drug advertisement
 - d) Writing a protocol for a clinical trial
 - e) Statistical evaluation of a given data

All practical exercises are to be evaluated jointly by all the examiners. An oral question-answer session should be conducted at the end of each exercise.

- (a) Viva on dissertation and research methodology
- (b) General Viva-Voce

COURSE CONTENT

Paper - I: General Pharmacological Principles and Applied Sciences:

Theories and mechanism of drug action, Pharmaco-kinetic principles and parameters, Factors modifying drug action, Pharmaco-genetics, Chrono-pharmacology, Adverse effects of drugs, Drug dependence, Toxicology, Dose-response relationships, structure-activity relationships, Physiological and biochemical basis of drug action, Etiopathogenesis of diseases relevant to therapeutic use of drugs, Basic microbiology, immunology and molecular biology. History of pharmacology, sources of drug information and use of Information Technology.

Paper II: Systemic Pharmacology, Chemotherapy and Therapeutics:

Pharmacology of drugs acting on autonomic, peripheral and central nervous systems; cardiovascular, endocrine, respiratory, renal, gastrointestinal and haemopoietic systems and treatment of diseases affecting these systems; Pharmacology of anti-microbial and anti-parasitic drugs and treatment of infective diseases; cancer chemotherapy, immuno-pharmacology, gene therapy and evidence based medicine.

Paper III: Experimental Pharmacology, Bioassay and Statistics:

Experimental methodologies involved in the discovery of drugs (in vivo, in vitro, ex vivo), Animal handling and animal care, Methods of anaesthetizing animals and methods of euthanasia, Restraining and blood collection methods, Drug screening methods involved in the evaluation of anti-ulcer, antidepressant, anti-anginal, anti-hypertensive, anti-arrhythmic, anti-diabetic, anti-cataract, anti-platelet, anticancer, anti-inflammatory, anti-diarrheal, anti-epileptic, analgesic, anti-thyroid, antipyretic, anti-glaucoma, anti-hyperlipidemic, anti-asthmatics drugs and cough suppressants, Drug screening methods used in screening anti-fungal, anthelmintic, antibacterial and antiviral agents, Drug screening methods for heart failure, posterior pituitary, adrenal steroid (glucocorticoids & mineralocorticoids), testicular, parathyroid, ovarian, thyroid hormones, Methods involved in testing teratogenicity, carcinogenicity and organ toxicities in animals.

Paper IV: Clinical Pharmacology and Recent advances:

Development of new drugs, protocol designing, phases, methodology and ethics of clinical trials, Clinical Pharmacokinetics and Pharmacodynamic studies post marketing surveillance, Therapeutic drug monitoring. Pharmacovigilance, ADR monitoring, Drug information service, drug utilization studies, therapeutic audit, essential drug concept and rational prescribing, GLP and GMP, Recent advances in understanding of mechanism of drug action and treatment of diseases; New drugs and new uses of old drugs.

Practical Training

Experimental methods discussion

- A. Screening and evaluation of drug activities including animal models for study of following actions:
1. Analgesic
 2. Anti-inflammatory
 3. Antipyretic; pyrogen testing
 4. Anticonvulsant
 5. Antianxiety
 6. Antipsychotic
 7. Antidepressant
 8. Antiparkinsonian
 9. Sedative, hypnotics
 10. Antihypertensive
 11. Antianginal
 12. Antiarrhythmic
 13. Skeletal muscle relaxant
 14. Local anaesthetic
 15. Antihistaminics, antiallergic
 16. Antisecretory & drugs for peptic ulcer

17. Antiemetic
18. Hypoglycaemic
19. Antifertility
20. Anticancer
21. Diuretic
22. Antimalarial
23. Antitubercular
24. Antidiabetic
25. Antiatherosclerotic
26. Bronchodilator & antiasthmatic drugs

B. Bioassay of:

1. Acetylcholine
2. Adrenaline/noradrenaline
3. Histamine
4. 5 - Hydroxytryptamine
5. Insulin
6. Antibiotics
7. Digoxin
8. Glucocorticoids

C. Methods for studying absorption, biotransformation and excretion of drugs.

D. Limitations of animal experiments in drug evaluation

E. Quantitative study of agonists and antagonists on isolated tissues.

F. Measurement of blood pressure in conscious and anaesthetised animals.

G. Extraction, purification and characterization of active principles from plant sources/crude products.

EXPERIMENTAL PHARMACOLOGY EXERCISES

1. Frog's rectus abdominis muscle: dose response curve (DRC) and cumulative DRC of acetylcholine; potentiation of ACh by physostigmine and antagonism by tubocurarine/pancuronium
2. Study of drug action on perfused frog's heart.
3. Study of drug action on isolated rabbit ileum
4. Dose-response curve of histamine on isolated guinea pig ileum, Cumulative dose response curve of histamine in isolated guinea pig tracheal chain.
5. Bioassay of histamine on guinea pig ileum by matching method, 3 point method and 4 point (latin square design) method
6. Bioassay of ACh on frog's rectus abdominis muscle
7. Determination of EC₅₀ and pD₂ values of histamine and ACh on guinea pig ileum and frog-rectus abdominis muscles.

8. Determination of ED₅₀ and pA₂ values of chlorphenarmine, pancuronium
9. Bio-assay of adranaline on rabbit duodenum.
10. Bio-assay of adrenaline on rat B.P.
11. Bio-assay of 5-HT on estrogen primed rat uterus.
12. Demonstration of muscarinic and nicotinic actions of ACh and carbachol on the RP. and respiration of anaesthetised dog/cat.
13. Demonstration of cholinesterase activity in blood and anti-cholinesterase activity of physostimine using B.P. and respiration of anaesthetised dog/cat
14. Demonstration oftac:hyphylaxis with ephedrine and vasomotor reversal henomenon on RP. and respiration of anaesthetised dog/cat.
15. Identification of the nature of unknown drug using B.P. and nictitating membrane contractions of anaesthetized cat.
16. Identification of the nature of unknown drug using B.P. and spleen volume of anaesthetized dog.
17. Identification of the nature of unknown drug using B.P. and intestine in situ of anaesthetized dog.
18. Study of drug action on isolated perfused rabbit heart (Langerdorffs technique).
19. Study of drug action on isolated rabbit auricles.
20. Demonstration of rabbit head drop with d-tubocurarine and its reversal by neostigmine.
21. Study of neuromuscular blocking agents using phrenic nerve-diaphragm preparation of rat.
22. Study of local anaesthetics by rabbit cornea, guineapig intradermal wheal, frog lumbar plexus.
23. Study of anti-convulsant activity of drugs on maximal electroshock seizures and metrazol induced convulsions in rats.
24. Study of analgesic activity of drugs using rat tail-hotwire method, hot plate method, acetic acid induced writhing.
25. Study of antiinflammatory activity of drugs against carraginin induced rat paw oedema.
26. Antagonism of histamine aerosol induced bronchospasm by anti-histaminics
27. Effect of psychopharmacological drugs on conditioned avoidance response (Cook's pole climbing).
28. Effect of pyschopharmacological agents on foot shock induced aggression in rats.
29. Effect of pyschopharmacological agents on elevated plus maze.
30. Effect of drugs on spontaneous motor activity of mice, photoactometer
31. Study of anorectic activity of amphetamine in mice.
32. Potentiation of barbiturate hypnosis by chlorpromazine.
33. Study of miotics and mydriatics on rabbit's eye.

Minor procedures:

- i) Mouse tail vein injection
- ii) Administration of drugs to rats by gastric cannula
- iii) Collection of blood from rat tail
- iv) Collection of blood by Cardiac puncture in rat
- v) Injection of drugs through marginal ear vein of rabbits.
- vi) Intraperitoneal and subcutaneous injection to rats and mice.
- vii) Intracerebroventricular injection in rat.

Chemical Pharmacology Exercises:

1. Identification of steroids, salicylates using chemical tests, Estimation of drug levels using colorimetry, spectrophotometry, fluorimetry, flame photometry, high performance liquid chromatography (HPLC), enzyme linked immunoassay.

Clinical Pharmacology Exercises

1. Recording B.P. in human volunteers.
2. Recording of ECG and measurement of heart rate, PR interval, QT interval, ST segment depression etc. in human volunteers.
3. Study of effect of sublingual nitroglycerine tablet on B.P. and heart rate.
4. Study of effect of Beta-blockers on exercise tolerance in volunteers utilising treadmill/bicycle ergometry/Master's Two step test.
5. Spirometry and respiratory function tests and effect of bronchodilators
6. Psychomotor testing in volunteers by 6 letter cancellation test, digit - letter symbol substitution test finger tapping test.
7. Assessment of analgesic activity in volunteers by soda water bottle cap - BP. cuff pressure test.
8. Mydriatic, miotic and cycloplegic effect of drugs in human subjects.
9. Effect of anticholinergic drugs on salivation, pupillary size, heart rate and memory.
10. Training at poison information center, Determination of plasma cholinesterases level in organo-phosphorus poisoned patients, Spot test for aluminum phosphide poisoning, Estimation of lead in drinking water and patients urine.
11. Molarity calculations and preparation of reagents, Estimation of serum salicylate levels using spectro-fluorimetric method, Estimation of plasma phenobarbitone concentration using spectro-photometer

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Syllabus and Curriculum for MD - PHYSIOLOGY 2012

Preamble

The purpose of this programme is to standardize Physiology teaching at Post Graduate level through out the country so that it will benefit in achieving uniformity in undergraduate teaching as well. Accordingly the training in MD- Physiology should be distinctive from that in M.Sc, Phd.G'hsiology), where the approach to the subject is primarily experimental.

Programme objectives

A candidate upon successfully qualifying in the MD (Physiology) examinations, should be able to:

- a) Be a competent physiologist,
- b) Effectively teach undergraduate medical (and paramedical) students the basic physiological mechanisms of human body, with reference to their implications in the pathogenesis of diseases (pathophysiology) and the physiological basis of their management.,
- c) Conduct such clinical/experimental research as would have significant bearing on human health and patient care.,
- d) Interact with the allied departments by rendering services in advanced laboratory investigations.,
- e) Acquire skills in conducting collaborative research in the field of physiology & allied sciences.,
- f) Must be able to demonstrate to the students how the knowledge of physiology can be used in a variety of clinical settings to solve diagnostic and therapeutic problems.

Specific Learning Objectives

- (a) Effectively teach undergraduate medical students the basic physiological mechanisms of human body, with reference to their implications in the pathogenesis of diseases (pathophysiology) and their management.
- (b) Conduct such clinical and experimental research, as would have a significant bearing on human health and patient care.,
- (c) Encourage interaction with the allied departments by rendering services In advanced laboratory investigations and relevant expert opinion.,
- (d) Encourage the student to participate is various workshops/seminars/journal clubs/demonstration in the allied departments, to acquire various skills for collaborative research.,
- (e) Uphold the prestige of the discipline amongst the fraternity of doctors.

Departmental resources

It be mandatory for the department to develop at least one of the following laboratories. The facilities outlined under each laboratory are only the minimal requirements. In addition to the facilities, the laboratory should be involved in active research in one or more well defined fields.

• Clinical Neurophysiology Laboratory

- (i) Electroencephalography
- (ii) Evoked potential recording
- (iii) Electromyography
- (iv) Nerve-conduction studies

• Cardio-Respiratory Laboratory

- (i) Electrocardiography and Holter
- (ii) Pulse plethysmograph
- (iii) GSR recorder
- (iv) Blood-gas Analyzer
- (v) Equipment for measuring pulmonary diffusion capacity and FRC besides usual Spirometric measurements.
- (vi) Whole-body plethysmograph

• Metabolic/Endocrinology/Reproductive Bio-medicine laboratory

This laboratory will perform various tests pertaining to Gastrointestinal, Renal, Metabolic, Endocrinal and Reproductive bio-medicine.

- (i) Spectrophotometer
- (ii) pH meter
- (iii) Elisa Reader/Washer
- (iv) Luminometer
- (v) Semi-autoanalyser

Candidates should be posted in the Biochemistry department of the college/where facilities are available on rotation basis.

The college/department should be equipped with general facilities like internet access and a departmental library well stocked with books and journals, especially those related to its field of research .

Post-graduate training

Based on the available facilities, department can prepare a list of post-graduate experiments pertaining to basic and applied physiology. Active learning should form the

mainstay of postgraduate training. There should be lectures for post-graduates (at least 20 per year), alongwith seminars, symposia, group-discussions, Journal clubs. The post-graduate students should regularly attend the ward rounds of various clinical departments and glean cases of interest for discussion v with the physiology faculty. They should render special investigative services in their respective area of specialization. Each college should have a Medical Education Unit to generate teaching resource material for UG and evolving of problem solving modules.

ASSESSMENT:-

General Principles

- The assessment should be valid, objective, and reliable.
- It must cover cognitive, psychomotor and affective domains.
- Formative, continuing and summative (final) assessment should be conducted in theory as well as practicals/clinicals. In addition, thesis should be assessed separately.

Overall Weightage

Internal assessment - 20%

Final summative examination - 80%

Formative assessment

The formative assessment should be continuous as well as end-of-term. The former should be based on the feedback from the senior residents and the unit faculty concerned. End-of-term assessment should be held at the end of each semester (upto the 5th semester). Formative assessment will not count towards pass/fail at the end of the program, but will provide feedback to the candidate. Scheme of internal assessment examination It is held by means of a written test and practical (and or clinical) with viva examination by all consultants of the department as per distribution of marks as follows. In such five six monthly tests a candidate shall be evaluated for 1000 marks in total i.e. 200 marks in each term as follows.

Item	1st term	2nd term	3rd term	4th term	5th term
Theory	75 marks	75 marks	75 marks	75 marks	75 marks
Oral, Practical/clinical	75 marks	75 marks	75 marks	75 marks	75 marks
Log book evaluation	50 marks	50 marks	50 marks	50 marks	50 marks
Total	200 marks	200 marks	200 marks	200 marks	200 marks
Gross total	1000 marks				
Carried forward to Final MD/MS Examination	20 % marks ~ 200 marks				

200 marks shall be carried over a period of five terms as follows.

- Log book evaluation- 10 x 5terms= 50 marks
- Theory exam 15 x 5terms= 75 marks
- Oral ,Practical/Clinical exam 15 x 5terms= 75 marks

Evaluation of the Log book:

Each candidate should be required to maintain a log book in which following details will be entered and evaluated on a scale of 1 to 10. At end of each term of 6months of training for 5such terms the logbook will be evaluated and a score is to be calculated out from a maximum of 100 marks for the 10 items as entered in the logbook.

- i. skills learned independently, under supervision or assisted by him. 1 to 10
- ii. Presentations in journal clubs1 to 10.
- iii. Cases presented in clinical meetings 1 to 10
- iv. Presentation in departmental seminars..... 1 to 10
- v. Intra and interdepartmental training and evaluation details.....1 to 10
- vi. Teaching activities.....1 to 10
- vii. Conferences/workshops/CME attended 1 to 10
- viii. Papers presented/published conferences.....1 to 10
- ix. Didactic lectures attended.....1 to 10
- x. Thesis progress and evaluation details.....1 to 10

MD Examination:

Pattern of question for theory Papers- There shall be four theory papers. One paper out of these shall be on ‘Basic Medical Sciences’ and one paper on ‘Recent Advances’ in the discipline. There shall be 100 marks for each paper to be answered in 3 hours’ time. There shall be ‘1 structured essay type question’ for 20 marks besides 8‘short essay type questions’ for 10 marks each in each paper.

Days of practical examination-Practical Examination should be conducted for a batch of upto 8 candidates over a minimum period of two to three days extendable up to 7days subject to the subject curriculum with due approval of the board of examiners. For a batch of more than 8 the examination may extend accordingly. The theory papers shall be evaluated at the examination center itself before commencement of the practical/clinical and oral examination in the subject during these practical examination days.

Components of examination-It consist of a written examination, a practical examination to assess the clinical/practical competencies and skills, and a viva voce examination.

The examinations shall consist of

- A) theory
- B) practical including clinical
- C) oral

A.Theory-

The 4 papers in theory shall be conducted well in advance before the oral , clinical/practical examination.

B. Practical

Clinical/Practical examination is the most important part of the evaluation and is aimed at assessing the clinical/practical skills of the candidate and diagnostic reasoning. Entirely objective evaluation of these skills is neither feasible nor desirable. However, in order to test the various skills, the examiners may evaluate the candidates on a structured format.

C. Pedagogic Skill

The candidate shall be allotted a topic from the discipline at a short notice of few hours, (preferably on the first day of the examination) to prepare and present before the board of examiners within a time span of 15 minutes (preferably on the second day of the examinations) . The teaching skill will be evaluated under various points(as illustrated below) and marks given accordingly.

- (i) Choice of article/topic (unless specifically allotted)
- (ii) Completeness of presentation
- (iii) Clarity of presentation
- (iv) Understanding of the subject and ability to convey the same
- (v) Whether relevant references have been consulted
- (vi) Ability to convey points in favour and against the subject under discussion
- (vii) Use of audio-visual aids
- (viii) Ability to answer questions
- (ix) Time scheduling
- (x) Overall performance

D. Viva-Voce

a.Viva-voce is expected to be conducted at every stage of the practical examination. The resident will be required to answer oral questions on any aspect of the specialty. Oral examination is designed to test the general scientific background of the candidate and his/her own particular contribution embodied by the thesis. A formal "grand viva-voce" may be held at the end of the practical examination. Questions on the thesis/dissertation may be asked at this time as well. The board of examiners will conduct the examination. They will read out the comments & questions and will seek the answers from the candidate. The viva voce should be assessed under the following headings:

1. Thesis viva voce
2. Grand viva voce

All examiners shall be jointly responsible for all parts of the examination. In presence of the external examiners, the Chairman of the conducting board shall make the necessary arrangements for conducting the oral and practical including clinical examination at the department in the college centre .

b. The candidate shall bring the logbook and a copy of his/her thesis mandatorily while appearing for the oral, practical and clinical examination.

Marks for examinations: The examinations shall be organized on the basis of marking system to evaluate and certify candidate's level of knowledge, skill and competence as per distributions mentioned below. In total the overall assessment for a postgraduate shall be for 1000 marks distributed as follows.

A.Internal assessment exam(200 marks)

- Theory 15x5=75
- Practical (Oral, clinical and practical) 15x5=75
- Log book evaluation 10x5=50
- Total : 40x5=200

B.Final MD/MS exam (800 marks)

- Theory (100 x 4 Papers) 400
- Oral ,Clinical/Practical 400
- I)Clinical/Practical (300 marks)
- Long exercise (one) 80 marks
- Short exercise (three) 120 marks
- OSPE(ten) 40 marks
- Spots(ten) 40 marks
- Pedagogic skill 20 marks

II) Viva	(100 marks)
Thesis Viva	20 marks
Grand Viva	80 marks
Grand Total	(A+B)= 1000 marks

PASS/FAIL- In order to pass the examination in each subject a candidate must secure not less than 50% marks in each head of passing which shall include (1) Theory (2) Practical including clinical and viva voce examination (3) internal assessment examination.

Plan of MD/MS Examination:-

The PG examination shall be carried out in three parts:-

1. Thesis, to be submitted by each candidate a~ least 4 months before the date of commencement of the theory examination.

2.Theory :-

- There shall be 4 papers with 100 marks for 3hours duration of examination each.
- There shall be 1 structured essay type questions for 20 marks along with 8 short answer type questions for 10 marks each in each paper.
- The chapter distribution for the papers shall be as follows.

paper-I : history of physiology ,general physiology.

paper-II : systemic physiology (transport, energy,nutrition),comparative physiology.

paper-III : systemic physiology(procreation,regulation,neural control).

paper-IV : applied physiology, recent advances.

3. Practicals

Should be spread over 2 days and include the follo iwing components:

1. Problem solving exercises pertaining to clinical physiology
2. Performing and reporting two special investigations
3. Animal experiments, illustrating mechanisms, physiological concepts and their applications to humans
4. Micro-teaching session for assessing communication skills
5. Viva-voce

SYLLABUS-THEORY

Paper-I (history of physiology ,general physiology)

1. Physiology of cell; various cellular mechanisms. Genetic control mechanisms.
2. Various principles involved in physiological phenomenon, e.g. haemodynamics, bio-electrical potentials, body fluids, methods of measurements.
3. Interaction of human body in ambient environment including high altitude and deep sea.

4. Sports physiology
5. Yoga & Meditation.
6. History of Physiology

Paper- II: : (systemic physiology (transport, energy,nutrition),comparative physiology)

1. Blood & Immunity
2. Cardio Vascular System
3. Respiratory System
4. Gastro Intestinal Tract & Dietary requirements
5. Excretion, pH & water & Electrolyte balance
6. Comparative Physiology

Paper-III: : (systemic physiology(procreation,regulation,neural control)

1. Reproduction & family planning/foetal & Neonatal physiology
2. Nerve-Muscle Physiology
3. Endocrine Physiology
4. Central Nervous System
5. Special Senses

Paper-IV : (Applied Physiology including Recent advances)

1. Patho-physiology pertaining to systemic physiology
2. Physiological basis of various Evaluation tests.
3. Statistics.
4. Recent advances.
5. Growth & Development including agia".

SYLLABUS FOR PRACTICAL TRAINING

Animal Experiments

Amphibian

- i) Free load and after load
- ii) Effect of repeated stimulation (study of phenomenon of Fatigue)
- iii) Properties of cardiac muscle - Long refractory period, All or None law
- iv) Extra-systole and compensatory pause, Beneficial effect.
- v) Regulation of Heart, Vagus dissection and effect of Vagal stimulation
- vi) Actions of Acetyl choline, Adrenaline and Nicotine on heart
- vii) Perfusion of isolated frog's heart-role of Sodium, Potassium, Calcium ions

Mammalian Experiments

- i) General management of mammalian experiments.
- ii) Recording of Blood pressure and Respiration on dog and also the effects of various factors

- iii) Recording of effect of stimulation of Vagus nerve on Blood pressure and respiration in dog.
- iv) Stimulation of central and peripheral end of Vagus on arterial pressure after Vagotomy
- v) Effect of drugs i.e. Adrenaline and Acetyl Choline on blood pressure and respiration in the dog.
- vi) Intestinal movement and Tone.
- vii) Effect of Adrenaline on intestinal movement and Tone
- viii) Effect of occlusion of carotid arteries on blood pressure and respiration
- ix) Effect of stimulation of splanchnic nerve (distal end) on arterial pressure.

Human Physiology

Clinical Physiology

- i) Elementary principles of clinical examination
- ii) Methods of Inspection|Palpation|Percussion|Auscultation
- iii) Plan of conduction and scheme of recording
- iv) General examination

Cardiovascular system

- i) Clinical examination of circulatory system.
- ii) Examination of pulse, blood vessels and measurements of blood pressure.

Respiratory system

- i) Clinical examination of respiratory system.

Abdominal system

- i) Clinical examination of Abdomen

Central nervous system.

- i) Clinical examination of the nervous system and its physiological basis
- ii) Examination of higher mental functions.
- iii) Clinical examination of the Special Senses including Cranial Nerves.
- iv) Tests of Hearing and Deafness
- v) Sensory functions
- vi) Motor functions
- vii) Reflex functions

Ophthalmology

- i) Clinical examination of the eye and pupillary reflex
- ii) Visual Acuity
- iii) Perimetry
- iv) Accomodation
- v) Fundoscopy
- vi) Colour vision and colour blindness

Laboratory Procedures

Haematology

- i) Haemocytometry

- ii) Determination of Reticulocyte count, Platelet count WBC count. RBC count, Eosinophil count in normal and diseased states.
- iii) Differential count of WEC
- iv) Haemoglobinometry - Spectroscopy
- v) Blood grouping and Cross matcing
- vi) Determination of Bleeding time and Clotting time
- vii) Haemolysis and Fragility tests

Cardiovascular system.

- i) Electrocardiography - ECG and its interpretation.

Respiratory system

- i) Spirometry
- ii) Assessment of Ventilatory functions.
- iii) Breath holding and Endurance tests
- iv) Recording of Lung function tests by computerized or electronic spirometer
- v) Sthethography
- vi) Resuscitation and Artificial respiration

Reproductive system

- i) Determination of Ovulation time by Basal body temperature chart, Cervical smear, and Vaginal smear.
- ii) Pregnancy diagnostic tests - Immunological Test
- iii) Sperm count

Nerve muscle physiology

- i) Ergography
- ii) Recording of EMG - nerve conduction both sensory and motor

Others

- i. Construction of dietary chart for growing children, hypertensive patients, & Diabetes Mellitus patients.
- ii. Tests for physical fitness.
 - a) Lab Harvard step test
- iii. Bicycle Ergometry
 - a) Tradmill protocols leading to determination of vo 2 max
 - b) Cardio respiratory response to whole body exercise.

Clinical Biochemistry

- i) Estimation of normal and abnormal constituents of urine
- ii) Estimation of blood sugar
- iii) Estimation of Serum Calcium
- iv) Kidney function tests

- v) Liver function tests
- vi) Gastric function tests (excluding Fractional test meal)
- vii) Glucose tolerance tests.

RECOMMENDED READING

• Text books-

1. Keele, Samson and Wright's Applied physiology
2. Best and Taylor - Physiological Basis for medical practice
3. Guyton - Text book of medical physiology
4. Ganong - Review of medical physiology
5. Cambell, Clinical physiology
6. P.F. Backer - Recent advances in physiology
7. Vernon - B Mount Castle, Medical Physiology Vol. 1 & Vol 11
8. Carl J. Wiggers - Physiology in health and disease
9. William' s Text of Endocrinology
10. West and Todd Text book of Biochemistry and physiology
11. Harper's Biochemistry
12. Duncon - Diseases of Metabolism
13. Joh Field - H.W. Magou - Hand book of Neuro Physiology
14. Carpenter - Neuro Physiology
15. Wallance-O-Fen Handbook of Respiratory Physiology
16. Prosser - Experimental Physiology
17. Prosser - Comparative Animal physiology manual
18. Wintrobe's - Clinical Haematology
19. Kelmen - Applied Cardio Vascular Physiology
20. Brown - Cell Signaling, Biology and medicine of signal transudation
21. Byrne - Introduction of Memberane Transport and Bioelectricity
22. Sudarasky - Patho physiology of the nervous system.

• Journals

1. American Journal of Applied Physiology
2. Annual Review of Physiology.
3. Advances in Physiological education and Recent advances in physiology.
4. Hand Book of Physiology (American Physiological Society)
5. Jounal of Physiology (British publication)
6. Indian of Journal of Physiologists and Pharmacologists
7. Journal of Experimental Physiology.
8. Indian Journal of Medical Research
9. Acta Physiologica Scandinavia

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Syllabus and Curriculum for MD-PEDIATRICS

2012

SEGMENT-1

GOAL

The goal of M D course in Pediatrics is to produce a competent pediatrician who:

- (i) recognizes the health needs of infants, children and adolescents and carries out professional obligations in keeping with principles of National Health Policy and professional ethics;
- (ii) has acquired the competencies pertaining to pediatrics that are required to be practiced in the community and at all levels of health care system;
- (iii) has acquired skills in effectively communicating with the child, family and the community;
- (iv) is aware of the contemporary advances and developments in medical sciences as related to child health;
- (v) is oriented to principles of research methodology; and
- (vi) has acquired skills in educating medical and paramedical professionals.

Segment-2

OBJECTIVES

At the end of the MD course in Pediatrics, the student should be able to:

- (i) recognize the key importance of child health in the context of the health priority of the country;
- (ii) practice the specialty of Pediatrics in keeping with the principles of professional ethics;
- (iii) identify social, economic, environmental, biological and emotional determinants of child and adolescent health, rehabilitative, preventive and promotive measures to provide holistic care to children;
- (iv) recognize the importance of growth and development as the foundation of Pediatrics; and help each child realize her/his optimal potential in this regard;
- (v) take detailed history, perform full physical examination including neuro-development and behavioral assessment and anthropometric measurements of the child and make clinical diagnosis;
- (vi) perform relevant investigative and therapeutic procedures for the pediatric patient;
- (vii) interpret important imaging and laboratory results;
- (viii) diagnose illness in children based on the analysis of history, physical examination and investigative work up;
- (ix) plan and deliver comprehensive treatment for illness in children using principles of rational drug therapy;
- (x) plan and advise measures for the prevention of childhood disease and disability;
- (xi) plan rehabilitation of children suffering from chronic illness and handicap, and those with special needs;
- (xii) manage childhood emergencies efficiently;

- (xiii) provide comprehensive care to normal, 'at risk' and sick neonates;
- (xiv) recognize the emotional and behavioral characteristics of children, and keep these fundamental attributes in focus while dealing with them;
- (xv) demonstrate empathy and humane approach towards patients and their families and respect their sensibilities;
- (xvi) demonstrate communication skills of a high order in explaining management and prognosis, providing counseling and giving health education messages to patients, families and communities;
- (xvii) develop skills as a self-directed learner, recognize continuing educational needs; use appropriate learning resources, and critically analyze relevant published literature in order to practice evidencebased pediatrics;
- (xviii) demonstrate competence in basic concepts of research methodology and epidemiology;
- (xix) facilitate learning of medical/nursing students, practicing physicians, para-medical health workers and other providers as a teacher-trainer;
- (xx) play the assigned role in the implementation of national health programs, effectively and responsibly;
- (xxi) organize and supervise the desired managerial and leadership skills;
- (xxii) function as a productive member of a team engaged in health care, research and education.

SEGMENT-3

TEACHING PROGRAM

General Principles

- Acquisition of practical competencies being the keystone of postgraduate medical education, postgraduate training should be skills oriented.
- Learning in postgraduate program should be essentially self-directed and primarily emanating from clinical and academic work. The formal sessions are merely meant to supplement this core effort.

Formal Teaching Sessions

In addition to bed side teaching rounds, at least 5 hours of formal teaching per week are must. The departments may select a mix of the following session.

- Journal Club : once a month
- Medical and Perinatal Audit : once a month
- Seminar/lecture : once a week
- Case Discussion : twice a week
- Interdepartmental case/seminar: once a month
- Faculty lecture : once a month
- *Accredited scientific meeting (CME, symposia, conferences)
- *Additional sessions on basic science, biostatistics, research methodology, teaching methodology, health economics, medical ethics and legal issues related to pediatrics practice.

(*Note: these session may be organised as an institutional activity for all postgraduates)

Rotations

Intradepartmental:

- Dept. unit wise rotation : every 3 months (fifth term with guide)
- Neonatology : 6 months[maximum 9 months]
- Intensive Care : 3 months
- Emergency : 3 months

Interdepartmental:

- Labor room : 4 weeks (8hrs per day)
- Immunization Clinic : 24 hours (CM OPD)
(e.g 3 hours/day for 2days per week
for 4weeks)
- Skin OPD : 12 hours (e.g 2hours/day for 6 days)
- Psychiatry OPD : 2weeks(2hrs per day)
- ART center : 2weeks(2hrs per day)
- Pathology Lab : 2weeks(3hrs per day)
- Radiology unit : 2weeks(3hrs per day)
- Cardiology OPD : 4weeks(3hrs per day)
- Nephrology OPD : 4weeks(3hrs per day)
- Neurology OPD : 4weeks(3hrs per day)
- Pulmonary medicine OPD : 2weeks(3hrs per day)

Segment-4

5. THESIS

5.1 Objectives

By carrying out a research project and presenting his work in the form of thesis, the student will be able to:

- (i) identify a relevant research question;
- (ii) conduct a critical review of literature;
- (iii) formulate a hypothesis;
- (iv) determine the most suitable study design;
- (v) state the objectives of the study;
- (vi) prepare a study protocol;
- (vii) undertake a study according to the protocol;
- (viii) analyze and interpret research data, and draw conclusions,
- (ix) write a research paper.

9.3.6. Thesis guideline-While selecting thesis topics, following guidelines are laid down to be followed as advisory.

- The guide for the candidate shall ensure that the subject matter selected for the thesis/dissertation is feasible, economical and original.

- The thesis may be normally restricted to the size to 100 pages including charts, diagrams, photographs and bibliography.
- Only contemporary and relevant literature may be reviewed.
- The techniques may not be described in detail unless any modification/innovations of the standard techniques are used and reference may be given.
- Illustrative material may be restricted.
- For prospective study, as far as possible, the number of cases should be such that adequate material, judged from the hospital attendance, will be available and the candidate will be able to collect the case material within a period of 12-18 months so that he/she is in a position to complete the work within the stipulated time.
- The objectives of the study should be well defined.
- As far as possible, only clinical or laboratory data of investigations of patients or such other material easily accessible in the existing facilities should be used for the study.
- Technical assistance, wherever necessary, may be provided by the sister departments 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 and co-guide by mutual consultation.
- The Clinical residents may not ordinarily be expected to undertake experimental work or clinical work involving new techniques, not hitherto perfected or not readily available.
- The residents should be able to use freely 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.
- Statistical methods used for analysis should be described in detail.
- The scope of study should be limited so that it is possible to conduct it within the resources and time available to the student;
- The emphasis should be on the process of research rather than the results.
- The research study must be ethically appropriate.

- The protocol, interim progress as well as final presentation must be presented formally to the entire department.
- There should be periodic review of the thesis work and entered in the log book as an internal assessment.
- The thesis shall relate to the candidate own work on a specific research problem or a series of clinical case studies in accordance with the approved plan.
- The thesis shall be written in English, printed or typed on white bond paper 22 x 28 cms with a margin of 3.5 cm. bearing the matter on one side of paper only and bound with the title, author's name and the name of the college and university printed on the front cover.
- Four copies of the bound thesis together with a certificate from the guide and a forwarding letter from the Head of department besides the certificate of approval from Institutional Research and Ethics Committee issued at the synopsis stage should reach the office of the registrar not later than clear four months from the date of commencement of MD/MS examinations. Further more five copies of the 'Thesis Evaluation Format' (as in appendix) shall be bound with the initial pages of the thesis.

9.3.7. Thesis structure-.Thesis should consist of :

- Certificates- must be attached with certificates of authenticity from the guide ,Head of Department and the Dean and Principal besides certificate of approval from the institute ethics committee.
- Title - Should be brief, clear and focus on the relevance of the topic
- Introduction-Should state the purpose of study, mention lacunae in current knowledge and enunciate the Hypothesis, if any.
- Aims and Objectives- Should be specific, clear cut and measurable
- Review of Literature- Should be relevant, complete and current to date.
- Material and Methods- Should include the type of study (prospective, retrospective, controlled double blind) details of material & experimental design procedure used for data collection & statistical methods employed; statement of limitations ethical issues involved.
- Observations-Should be organized in readily identifiable sections having correct analysis of data be presented in appropriate charts, tables, graphs & diagram etc. These should be statistically interpreted.

- Discussion- Observations of the study should be discussed and compared with other research studies. The discussion should highlight original findings and should also include suggestion for future.
- Summary and Conclusion
- Bibliography - Should be correctly arranged in Vancouver pattern.
- Appendix-All tools used for data collection such as questionnaire, interview schedules, observation check lists etc should be put in the annexure

SEGMENT-5

ASSESSMENT – INTERNAL AND FINAL

6.1 General Principles

- The assessment should be valid, objective, and reliable.
- It must cover cognitive, psychomotor and affective domains.
- Formative, continuing and summative (final) assessment should be conducted in theory as well as practicals/clinicals. In addition, thesis should be assessed separately.

6.2 Overall Weightage

Internal assessment - 20%

Final summative examination - 80%

6.2.1 Formative assessment

The formative assessment should be continuous as well as end-of-term. The former should be based on the feedback from the senior residents and the unit faculty concerned. End-of-term assessment should be held at the end of each semester (upto the 5th semester). Formative assessment will not count towards pass/fail at the end of the program, but will provide feedback to the candidate. Scheme of internal assessment examination It is held by means of a written test and practical (and or clinical) with viva examination by all consultants of the department as per distribution of marks as follows. In such five six monthly tests a candidate shall be evaluated for 1000 marks in total i.e. 200 marks in each term as follows.

Item	1st term	2nd term	3rd term	4th term	5th term
Theory	75 marks	75 marks	75 marks	75 marks	75 marks
Oral, Practical/clinical	75 marks	75 marks	75 marks	75 marks	75 marks
Log book evaluation	50 marks	50 marks	50 marks	50 marks	50 marks
Total	200 marks	200 marks	200 marks	200 marks	200 marks
Gross total	1000 marks				
Carried forward to Final MD/MS Examination	20 % marks ~ 200 marks				

200 marks shall be carried over a period of five terms as follows.

- Log book evaluation- 10 x 5terms= 50 marks
- Theory exam 15 x 5terms= 75 marks
- Oral ,Practical/Clinical exam 15 x 5terms= 75 marks

Evaluation of the Log book:

Each candidate should be required to maintain a log book in which following details will be entered and evaluated on a scale of 1 to 10. At end of each term of 6months of training for 5such terms the logbook will be evaluated and a score is to be calculated out from a maximum of 100 marks for the 10 items as entered in the logbook.

- i. skills learned independently, under supervision or assisted by him.1 to 10
- ii. Presentations in journal clubs1 to 10.
- iii. Cases presented in clinical meetings 1 to 10
- iv. Presentation in departmental seminars..... 1 to 10
- v. Intra and interdepartmental training and evaluation details.....1 to 10
- vi. Teaching activities.....1 to 10
- vii. Conferences/workshops/CME attended 1 to 10
- viii. Papers presented/published conferences.....1 to 10
- ix. Didactic lectures attended.....1 to 10
- x. Thesis progress and evaluation details.....1 to 10

Syllabus for end semester theory exams :

- 1. Semester I. Growth and development, behavioral disorder, nutrition, immunization, infections disease, biostatistics.
- 2. Semester II. Respiratory system, gastroenterology, hepatology and neurology.
- 3. Semester III. Neonatology, emergencies, nephrology and endocrinology.
- 4. Semester IV. Hematology, hematoncology immunology, genetics, behavioral and psychological adolescent health disorders, social and preventive peditrics and other specialities.
- 5. Semester V. Whole syllabus
Theory assessment at the end of each semester will consist of 5 short answer questions.
End semester practical exam – one case, Viva, OSCE (Neonatology)

MD Examination:

Pattern of question for theory Papers- There shall be four theory papers. One paper out of these shall be on ‘Basic Medical Sciences’ and one paper on ‘Recent Advances’ in the discipline. There shall be 100 marks for each paper to be answered in 3 hours’ time. There shall be ‘1 structured essay type question’ for 20 marks besides 8 ‘short essay type questions’ for 10 marks each in each paper.

Days of practical examination-Practical Examination should be conducted for a batch of upto 8 candidates over a minimum period of two to three days extendable up to 7days subject to the subject curriculum with due approval of the board of examiners. For a batch of more than 8 the examination may extend accordingly. The theory papers shall be evaluated at the examination center itself before commencement of the practical/clinical and oral examination in the subject during these practical examination days.

Components of examination-It consist of a written examination, a practical examination to assess the clinical/practical competencies and skills, and a viva voce examination.

The examinations shall consist of

- A) theory
- B) practical including clinical
- C) oral

A.Theory-

The 4 papers in theory shall be conducted well in advance before the oral ,clinical/practical examination.

B. Practical

Clinical/Practical examination is the most important part of the evaluation and is aimed at assessing the clinical skills of the candidate and diagnostic reasoning. Entirely objective evaluation of these skills is neither feasible nor desirable. However, in order to test the various skills, the examiners may evaluate the candidates on a structured format, namely, history taking, physical examination, diagnostic reasoning, choice of diagnostic investigations, general management strategies, and general attitude and demeanor towards the patient and the examiners. Patient material selected for examination is should be usually sufficiently representative of the type of patients for whom an internist may be called upon to give an opinion.

C. Pedagogic Skill

The candidate shall be allotted a topic from the discipline at a short notice of few hours, (preferably on the first day of the examination) to prepare and present before the board of examiners within a time span of 15 minutes (preferably on the second day of the examinations) . The teaching skill will be evaluated under various points(as illustrated below) and marks given accordingly.

- (i) Choice of article/topic (unless specifically allotted)
- (ii) Completeness of presentation
- (iii) Clarity of presentation
- (iv) Understanding of the subject and ability to convey the same
- (v) Whether relevant references have been consulted
- (vi) Ability to convey points in favour and against the subject under discussion
- (vii) Use of audio-visual aids
- (viii) Ability to answer questions
- (ix) Time scheduling
- (x) Overall performance

D. Viva-Voce

a. Viva-voce is expected to be conducted at every stage of the practical examination. The resident will be required to answer oral questions on any aspect of the specialty. Oral examination is designed to test the general scientific background of the candidate and his/her own particular contribution embodied by the thesis. A formal "grand viva-voce" may be held at the end of the practical examination. Questions on the thesis/dissertation may be asked at this time as well. The board of examiners will conduct the examination. They will read out the comments & questions and will seek the answers from the candidate. The viva voce should be assessed under the following headings:

1. Thesis viva voce
2. Grand viva voce

All examiners shall be jointly responsible for all parts of the examination. In presence of the external examiners, the Chairman of the conducting board shall make the necessary arrangements for conducting the oral and practical including clinical examination at the department in the college centre .

b. The candidate shall bring the logbook and a copy of his/her thesis mandatorily while appearing for the oral, practical and clinical examination.

Marks for examinations: The examinations shall be organized on the basis of marking system to evaluate and certify candidate's level of knowledge, skill and competence as per distributions mentioned below. In total the overall assessment for a postgraduate shall be for 1000 marks distributed as follows.

A.Internal assessment exam(200 marks)

- Theory 15x5=75
- Practical (Oral, clinical and practical) 15x5=75
- Log book evaluation 10x5=50
- Total : 40x5=200

B.Final MD/MS exam (800 marks)

- Theory (100 x 4 Papers) 400
- Oral ,Clinical/Practical 400

I)Clinical/Practical (300 marks)

- Long exercise (one) 80 marks
- Short exercise (three) 120 marks
- OSPE(ten) 40 marks
- Spots(ten) 40 marks
- Pedagogic skill 20 marks

II) Viva (100 marks)

- Thesis Viva 20 marks
- Grand Viva 80 marks

Grand Total (A+B)= 1000 marks

PASS/FAIL- In order to pass the examination in each subject a candidate must secure not less than 50% marks in each head of passing which shall include (1) Theory (2) Practical including clinical and viva voce examination (3) internal assessment examination.

Pattern of Questions;-

- There shall be 4 papers with 100 marks for 3hours duration of examination each.
- There shall be 100 marks for each paper to be answered in 3 hours' time. There shall be '1 structured essay type question' for 20 marks besides 8 'short essay type questions' for 10 marks each in each paper.
- The chapter distribution for the papers shall be as follows.

paper-I : basic science related to pediatrics.

paper-II : neonatology, community pediatrics

paper-III : general pediatrics and recent advances related to cluster-I chapters i.e.-nutrition, growth and development, immunization, infectious disease, genetics, immunology, rheumatology, psychiatry and behavioral sciences,skin,eye,ENT, adolescent health, critical care, accidents and poisoning.

paper-IV : general pediatrics and recent advances related to cluster-II chapters i.e.-neurology and disabilities, nephrology, endocrinology,

hematology-oncology, gastroenterology and hepatology, respiratory and cardiovascular disorders.

Segment-5

MODEL THEORY PAPER:

MD-PEDIATRICS

Paper-I

Time-3 hrs

Maximum marks-100

Answer all questions

1. What do you mean by 'reference growth chart' and 'standard growth chart'? Give a brief account of 'WHO Growth Chart'.
5+15=20 marks
2. Write shortly on:
8x10=80 marks
 - a. Neonatal encephalopathy
 - b. HMF
 - c. Low osmolar ORS
 - d. Secondary prophylaxis for Rheumatic fever
 - e. Ten steps of hospital management of 'severe childhood under nutrition'
 - f. Tests for Congenital Deafness resuscitating a 'meconium stained baby'
 - g. Hot tub folliculitis
 - h. Neonatal hypoglycemia
 - i. Infection prevention in sickle cell anaemia

MODEL Practical /Clinical ,Oral

PAPER: MD-PEDIATRICS

Paper- Oral, clinical and practical

Maximum marks-400

Answer all questions

1. Work up and present the child patient
in bedno-1 as a long case.(work up time-60 mts) Marks-80
2. Work up and present the child patient
in bed no.-2 as a short case.(work up time-30mts) Marks-40
3. Work up and present the child patient
in bed no.-3 as a short case. (work up time-30mts) Marks-40
4. Work up and present the neonate patient
in bed no.-4 as a short case.(work up time-30mts) Marks-40
5. Answer the 10 Spotters/OSCE stations as directed. Marks-80
6. Teach with power point presentations
on the given topic.(presentation-15mts) Marks-20
7. Appear in the thesis viva and grand viva with
all the four examiners on defined areas. Marks-100
 - thesis viva- 20 marks (5x4)
 - intensive care and emergency- 20 marks
 - vaccinology- 20marks
 - neonatology- 20marks
 - nutrition- 20 marks

SEGMENT-6

COURSE CONTENT

General Guidelines : during the training period effort must always be made that adequate time is spent in discussing child health problems of public health importance in the country or a particular region.

Paper I

Basic Sciences

Basics of genetics and molecular biology,embryogenesis of different organ system especially heart,genitourinary system,gastrointestinal tract, applied anatomy of different organs,functions of kidney,liver,lungs,heart and endocrinal glands.Physiology of micturition and defecation, placental physiology,fetal and neonatal circulation ,regulation of temperature(esp. newborn),blood pressure,acid base balance, fluid electrolyte balance,calcium metabolism,vitamins and their functions, hemopoiesis, hemostasis,bilirubin metabolism,growth and development at different ages, puberty and its regulation,nutrition, normal requirements of various nutrients,basic immunology, bio-statistics, clinical epidemiology,ethical and medico-legal issues, teaching methodology and managerial skills,Pharmacokinetics of commonly used drugs, microbial agents and their epidemiology.

Paper II

Neonatology and Community Pediatrics.

Neonatology: Normal newborn,lowbirth weight newborn, sick newborn,perinatal care,normal newborn, care in the labour room and resuscitation, low birth weight, prematurity,newborn feeding,common transient phenomena,respiratory distress,apnea,infections,jaundice,anemia and bleeding disorders ,neurologic disorders, gastrointestinal disorders,renal disorders ,malformations, thermoregulation and its disorders, understanding of perinatal medicine . Maternal nutritional disorders:impact on fetal outcome,nutrition for the low birth weight,brest feeding,infant feeding including complementary feeding.

Community and Social Pediatrics: National health nutrition programs related to child health, nutrition screening of community, prevention of blindness, school health programs, prevention of sexually transmitted diseases, contraception, health legislation , child labor, adoption , disability and rehabilitation, right of the child, national policy on child health and population, juvenile delinquency, government and non government support services for children, investigation of adverse events following immunization in a community, general principles of prevention and control of infections including food , water, soil and vector borne diseases and investigation of an epidemic in a community.

Paper III

Nutrition :

Protein energy malnutrition(under weight, wasting, stunting) vitamin and mineral deficiencies trace elements and micro nutrient deficiencies obesity. adolescent nutrition, nutritional management of systemic neonates and children illness (celiac disease, hepatobiliary disorders, nephrotic syndrome),perenteral ant enteral nutrition in neonates and children.

Growth and development:

Principles of growth and development , normal growth and development in childhood and adolescence, deviations in growth and development, sexual maturation and its disturbances, short stature, obesity, precocious & delayed puberty, developmental delay, impaired learning.

Infections :

Bacterial , viral, fungal, parasitic, rickettsial, mycoplasma, protozoal infection, tuberculosis, pneumocystis carini infections, chlamydia, HIV , protozoal and parasitic , nosocomial infections, control of epidemics and infection prevention

immunization & Infections diseases :

Bacterial , viral, fungal, parasitic, rickettsial, mycoplasma, protozoal infection, tuberculosis, pneumocystis carini infections, chlamydia, HIV , protozoal and parasitic , nosocomial infections, control of epidemics and infection prevention

Behavioral & Developmental disorders :

Rumination , pica, enuresis, encopresis, sleep disorders, habit disorders, breath holding spells, anxiety disorders, mood disorders, temper tantrums, attention deficit hyperactivity disorders, infantile autism

Skin Diseases :

Exanthematous illnesses, vascular lesions, pigment disorders, vesicobullous disorders, infections: pyogenic , fungal and parasitic, Steven-Johnson syndrome, eczema, seborrheic dermatitis , drug rash, urticaria, alopecia, ichthyosis

Eye problems :

Refraction and accommodation , partial/total loss of vision cataract, night blindness, chorioretinitis, strabismus , conjunctival and corneal disorders, retinopathy of prematurity, retinoblastoma, optic atrophy, papilledema

ENT :

Acute and chronic otitis media , conductive/sensorineural hearing loss, diphtheria-tonsillar, nasal, post-diphtheritic palatal palsy, acute/chronic tonsillitis/adenoids , allergic rhinitis/ sinusitis Emergency and critical care: Emergency care of shock, cardiorespiratory arrest, respiratory failure, congestive cardiac failure, acute renal failure, status epilepticus, fluid and electrolyte disturbances and its therapy, acid based disturbances, poisoning, accidents, scorpion & snake bites. Accidental and common poisoning

Paper IV

Neurology :

Limping child, convulsions, abnormality of gait, intracranial space occupying lesion, paraplegia, quadriplegia, large head, small head, floppy infant, acute flaccid paralysis , cerebral palsy and other neuromotor disability, headache

Hematology & Oncology :

Deficiency anemias , hemolytic anemias, aplastic anemia,, pancytopenia, disorders of hemostasis , thrombocytopenia, blood component therapy, transfusion related infections, bone marrow transplant/stem cell transplant, acute and chronic leukemia, myelodysplastic syndrome , Hodgkin disease, non-Hodgkin's lymphoma , neuroblastoma, wilms tumor, hypercoagulable states.

GIT and liver :

Acute, persistent and chronic diarrhea, abdominal pain and distension, ascites, vomiting, constipation, gastrointestinal bleeding, jaundice, hepatosplenomegaly and chronic liver disease, hepatic failure and encephalopathy

Endocrinology :

Hypopituitarism/hyperpituitarism, diabetes insipidus, pubertal disorders, hypo- and hyper-thyroidism, adrenal insufficiency, Cushing's syndrome, adrenogenital syndromes, diabetes mellitus, short stature, failure to thrive, gonadal dysfunction and intersexuality, pubertal changes and gynecological disorders.

Gastrointestinal and liver disease :

Disease of mouth, oral cavity and tongue, disorders of deglutition and esophagus, peptic ulcer disease, H. pylori infection, foreign body, congenital pyloric stenosis, intestinal obstruction, malabsorption syndrome, acute and chronic diarrhea, irritable bowel syndrome, ulcerative colitis, hirschsprung's disease, anorectal malformations, hepatitis, hepatic failure, chronic liver disease, Wilson's disease, Budd-Chiari syndrome, metabolic diseases of liver, cirrhosis and portal hypertension

Cardiovascular :

Murmur, cyanosis, congestive heart failure, systemic hypertension, arrhythmia, shock

Respiratory :

Cough/chronic cough, noisy breathing, wheezy child, respiratory distress, hemoptysis

Miscellaneous :

Habit disorders, hyperactivity and attention deficit syndrome, arthralgia, arthritis, multiple congenital anomalies

SEGMENT-7

skills

1. History and examination :

history taking including psychosocial history, physical examination including newborn examination, including gestation fundus examination assessment, assessment of growth nutritional anthropometry and its assessment use of growth chart SMR rating developmental evaluation full systemic examination health functionaries and social communication with children parents support groups genetic counseling

2 Bedside procedures :

Monitoring skills:

Temperature recording, Capillary blood sampling, arterial blood sampling.

Therapeutic skills :

hydrotherapy, nasogastric feeding, endotracheal intubation, cardiopulmonary resuscitation, administration of oxygen (pediatric and neonatal), venepuncture and establishment of vascular, administration of fluids, blood access blood components, parenteral nutrition, intraosseous fluid administration, intrathecal administration of drugs, common dressings abscess drainage and basic principle of rehabilitation.

Investigative skills :

blood sampling, venous and arterial, lumbar puncture, ventricular tap, bone marrow aspiration and biopsy, peritoneal, pericardial and subdural tap, kidney biopsy,

liver biopsy, muscle and nerve biopsy, collection of urine for culture, urethral catheterization suprapubic aspiration

3.Diagnostic:

Bedside investigations :

Hemoglobin, TLC, ESR, peripheral smear staining and urine routine and microscopic examination examination, stool microscopy including hanging drop, examination of CSF and other preparation body fluids, Gram stain , ZN stain, shake test on gastric aspirate

Interpretation :

interpretation of X-rays of chest, abdomen, bone and head, ECG, ABG, report CT scan. findings; ultrasound and Understanding of common EEG patterns, audiograms , ultrasonographic abnormalities and isotope studies

SEGMENT-8

Recommended book and journals

5. Behrman RE, Kliegman RM, Jenson HB. Nelson Textbook of Pediatrics. Harcourt Asia Pte Ltd,16th edition, 2000.
6. Rudolph AM, Hoffman JIE, Rudolph CD. Rudolph's Pediatrics. Appleton and Lange, 20th edition,1996.
7. Campbell AGM, McIntosh N. Forfar and Arneil's Textbook of Pediatrics. ELBS. 4th edition,1992.
8. Ghai OP, Gupta P, Paul VK. Essential Pediatrics. Interprint, New Delhi, 5th edition, 2001.
9. Singh M. Pediatrics Clinical Methods. Sagar Publications, 1st edition, 1992.
10. Siberry GK, Iannone R. The Harriet Lane Handbook. Mosby & Harcourt India. 15th Edition,2000.
11. Singh M, Deorari AK. Drug Doses in Children. Sagar Publications, 2001.
12. Growth and Development
13. Illingworth RS. The development of the infant and young child. Normal and abnormal. Churchill Livingstone, 9th edition, 1987.
14. Nutrition
15. Alleyne GAO, Hay RW, Picou DI, Stanford JP, Whitehead RG. Protein energy malnutrition. Jaypee Brothers, 1989.
16. Management of severe malnutrition: a manual for physicians and other senior health workers.WHO, Geneva, 1999.
17. Suskind RM, Lewinter-Suskind C. The malnourished child. Nestle Nutrition Workshop Series.Volume 19, 1990.
18. Infectious diseases
19. Feigin RD, Cherry ID. Textbook of Pediatric Infectious Diseases. W. B. Saunders, 5th edition,2000.
20. Remington JS, Klein JO. Infectious Diseases of the Fetus and Newborn Infant. W. B. Saunders,5th edition, 2000.
21. Weatherall DJ, Ledingham JGG, Warrell DA. Oxford Textbook of Medicine; Volume I. Oxford University Press, 3rd edition, 1996.
22. Cook G. Manson's tropical diseases. ELBS and W. B. Saunders Co., 20th edition, 1996.
23. Seth V, Kabra SK. Essentials of tuberculosis in children. Jaypee Brothers, 2nd edition, 2001.
24. Pizzo PA, Wilfert CM. Pediatric AIDS. Lippincott Williams & Wilkins. 3rd Edition, 1998.
25. Intensive care

26. Singh M. Medical emergencies in children. Sagar Publications, 3rd edition, 2000. .
27. Rogers MC, Nichols DG. Textbook of Pediatric intensive care. Williams & Wilkins, 3rd Edition,1996.
28. Neonatology
29. Singh M. Care of the Newborn, Sagar Publication, 2000.
30. Avery GB, Fletcher MA, MacDonald MG. Neonatology- Pathophysiology and Management of the Newborn. Lippincott William and Wilkins, 5th edition, 2000.
31. Cloherty JP, Stark AR. Manual of Neonatal Care. Lippincott- Raven Publishers, 4th edition, 1998.
32. Kattwinkel I. Textbook of neonatal resuscitation. American Heart Association and American Academy of Pediatrics, 4th edition, 2000. Neurology
33. Swaiman B, Kenneth F, Ashwal S. Pediatric Neurology: Principles and Practice. St. Louis Mosby, 3rd edition, 1999.
34. Brett EM. Pediatric Neurology . Churchill Livingstone, 3rd edition, 1997.
35. Menkes JH. Textbook of Childhood Neurology. Lea and Febiger, 5th edition, 2000. Cardiology
36. Allen HO, Clark FB, Gutgesell HP, Driscoll DJ. Moss and Adam's Heart Disease in Infants, Children and Adolescents. Lippincott Williams and Wilkins, 6th edition, 2001.
37. Park MK. Pediatric cardiology for practitioners. Mosby- YearBook, Inc., 3rd edition, 1996. Gastroenterology
38. Suchy FI, Sokol RJ, Balistreri WF. Liver disease in children. Lippincott Williams and Wilkins, 2nd edition, 2001.
39. Bhan MK, Bhatnagar S. Guidelines for management of diarrhea in children. Ministry of Health, GOI and WHO/SEARO, 2000. Endocrinology
40. Lifshitz F. Pediatric Endocrinology. Marcel Dekker, Inc., 3rd edition, 1995.
41. Sharma S, Singhal T, Bajpai A. Management protocols in pediatric endocrinology. April 2000.
42. Desai MP, Bhatia B, Menon PSN. Pediatric Endocrine Disorders. Orient Longman, 2001. Nephrology
43. Barratt TM, Avner ED, Harmon WE. Pediatric nephrology. Baltimore Williams and Wilkins, 4th edition, 1998.
44. Srivastava RN, Bagga A Pediatric Nephrology, 3rd edition, Jaypee, New Delhi, 2001. Hematology & Oncology
45. Nathan DG, Orkin SH. Nathan and Oski's Hematology of Infancy and Childhood. W. B. Saunders, 5th edition, 1998. Rheumatology
46. Cassidy JT, Petty RE. Textbook of Pediatric Rheumatology. W. B. Saunders, 4th edn. 2001. Respiratory Medicine
47. Chernick V, Boat TF. Kendig's Disorders of the Respiratory Tract in Children. WB Saunders. 6th Edition 1998.

Journals recommended

1. Archives of diseases of childhood
2. Journal of American Academy of Pediatrics
3. Pediatrics Clinic of North America.
4. Indian Pediatrics
5. Indian journal of pediatrics

SYLLABUS AND CURRICULUM FOR MD - PULMONARY MEDICINE 2012

1. Goals

The aim of development of curriculum in MD (Pulmonary Medicine) to produce competent specialists and/ or medical teachers;

- i) Who shall recognize the health needs of the community, and carry out professional obligations ethically and in keeping with the objectives of the national health policy in relation to Tuberculosis & different Chest diseases..
- ii) Who shall have mastered most of the competencies, pertaining to the Tuberculosis & different Chest diseases, that are required to be practiced at the secondary and the tertiary levels of the health care delivery system.
- iii) Who shall be aware of the contemporary advances and developments in the Tuberculosis & Chest diseases.
- iv) Who shall have acquired a spirit of scientific inquiry and are oriented to the principles of research methodology and epidemiology.
- v) Teaching and training of future undergraduate and postgraduate medical students, junior doctors & paramedical staffs & students in the specialty of TB & RD in different medical colleges, institution and other hospitals.
- vi). Organize health teams to provide care during natural or manmade calamities receiving the assistance from the specialty of TB & RD.

2. Objectives

At the end of the Postgraduate training in the Pulmonary Medicine, the students

- i) They should obtain adequate knowledge in basic sciences like Embryology, Anatomy, Physiology, Biochemistry, Micro-biology and general surgical principles related to TB&RD
- ii) A thorough knowledge of epidemiology, natural history, pathological abnormalities, clinical manifestations, and principles of management of a large variety of medical disorders of adults and elderly, affecting Pulmonary system.
- iii) Identify social, economic, environmental, biological, and emotional determination of health in a given case, and take them into account while planning therapeutic, rehabilitative, preventive, and promotive measures/ strategies in relation to Tuberculosis & Chest diseases.

- iv) Diagnose and manage majority of the conditions in the Pulmonary Medicine on the basis of clinical assessment, and appropriately selected and conducted investigations;
- v) A thorough knowledge of the practical aspects and methods of prevention and protection against nosocomial infections from (a) patient-to-patient (b) patient-to-health care worker HCW) (c) HCW-to-patient; in any health care setting.
- vi) Skill and competence to choose and interpret correctly the results of specialized investigations including radiologic, ultra-sonographic, biochemical, haemodynamic, electro-cardiographic, electrophysiological, pulmonary functional, hematological, immunological, nuclear isotope scanning and arterial blood gas analysis results.
- vii) Skills and competence to perform commonly used diagnostic procedures, namely, Thoracostomy, Polysomnography, Bronchoscopy, Medical Thoracoscopy & Pulmonary Function tests, lumbar puncture, pleural biopsy, fine needle aspiration cytology of chest lumps, pleural /abdominal aspiration; take an electrocardiogram tracing, and be able to interpret their findings.
- viii) Demonstrate empathy and humane approach towards patients and their families and exhibit interpersonal behaviour in accordance with the societal norms and expectations;
- ix) Play the assigned role in the implementation of national health programmes, effectively and responsibly;
- x) Organize and supervise the chosen/ assigned health care services demonstrating adequate managerial skills in the clinic/ hospital, or the field situation;
- xi) Develop skills as a self-directed learner, recognize continuing educational needs; select and use appropriate learning resources
- xii) Skill and competence to provide consultation to other medical and surgical specialities and subspecialities, whenever needed.
- xiii) Skill and competence to function effectively in varied clinical settings, namely, ambulatory care, out-patient clinic, in-patient wards, or emergency/critical care.
- xiv) Skill and competence to take sound decisions regarding hospitalization, or timely referral to other consultants of various medical subspecialities recognizing his limitations in knowledge and skills in these areas.
- xv) Proficiency in selecting correct drug combinations for different clinical problems with thorough knowledge of their pharmacological effects, side-effects, interactions with the other drugs, alteration of their metabolism in different clinical situations, including that in the elderly.
- xvi) Skill and competence to administer intensive care to seriously ill patients in collaboration with specialists from other areas. Should have acquired adequate skills in cardiopulmonary resuscitation, endotracheal intubation, setting up a central venous line, using a defibrillator, and providing basic ventilator support. The resident in medicine must become familiar with the basic monitoring equipments in the

critical-care area of the medicine ward, and should be able to interpret the information provided by the correctly.

- xvii) Skill and competence to understand research methodology in clinical medicine and to undertake a critical appraisal of the literature published in various medical journals and be able to apply the same in the setting in which the resident is working.
- xviii) Develop skills in using educational methods and techniques as applicable to the teaching of medical, nursing, paramedical students. General physicians, other categories of health workers; and function as an effective leader of a health team engaged in health care, research, or training

3. Training Programme

First 6 months (Orientation programme):

- i) Attending PG orientation programme. (Covering the main teaching methods, issues relating to establishing rapport with the patients, Ethical issues involved in rendering the patient care services, research methodology)
- ii) Care of indoor patients under guidance of seniors.
- iii) Taking case-history, working up indoor cases, writing admission and discharge summaries.
- iv) Performing Minor-OT procedures in OPD.
- v) Attending emergency and referral calls under the supervision of Senior Resident / Assistant Professor / Associate Professor.
- vi) Attending ward rounds and assisting in carrying out the instructions by senior staff.
- vii) Attending Out Patient Department patients under the supervision of seniors.
- viii) Keeping records and maintenance of ward, OPD, and emergency statistics.
- ix) Preparation of Dissertation protocol and getting it approved by the PG thesis committee and the Ethical committee of the concerned Institute.
- x) Posting in other related disciplines. (Preferably during the 1st and 2nd year of the course.)

After 6 months to the end of the course:

- i) Presenting indoor patients in ward rounds
- ii) Attending OPD patients.
- iii) Doing emergency duties of 24hr duration by rotation among all residents.
- iv) Presenting seminars, journals, cases on rotation basis.
- v) Attending Inter-departmental meetings and planning the management.
- vi) Ensuring proper management of indoor patients and proper record keeping by juniors.
- vii) Attending medical care review meetings, Central Academic programmes and other guest-lectures organized by institute.
- viii) Taking clinical classes for undergraduate students posted in TB&RD.

- ix) Properly carrying out dissertation work and submitting in scheduled time.
- x) Taking interest in research work, publishing review articles / case reports in journals
- xi) Attending conferences and work-shops.
- xii) Postgraduate students shall maintain a record (log) book of the work carried out by them and the training programme undergone during the period of training. The record (Log) books shall be checked and assessed periodically by the Faculty members imparting the training.

4. TEACHING SCHEDULE

CLINICAL POSTING:

- i) General Medicine.....1 month
- ii) Cardiology15 days
- iii) Radiodiagnosis15 days
- iv) Anesthesiology15 days
- v) Pediatrics7 days
- vi) Microbiology7 days
- vii) Social & Preventive Medicine15 days
- viii) Radiotherapy15 days

The candidates should be posted in the Outpatient, Inpatient, Emergency room and Intensive Care Unit where he/she learns clinical decision making, therapeutic decision in routine ward work and emergencies.

5. SKILLS

The following skill should be possessed by candidate appearing for M.D (Pulmonary Medicine)

A. Communication skills.

a) Communication with peer Group by way of:

- Case presentation
- Clinico-pathological exercise
- Seminars & small conferences.

b) Communication with students and colleagues:

- Undergraduate teaching
- Demonstrations

c) Research Communication:

- Gathering and compiling data, analysis and presentation Designing a research protocol.
- Writing a structured abstract.

B. Administrative skills:

a) Stores and equipment

- Knowledge about requirement, estimation of cost and expenditure and equipment and maintenance.
- Procurement and maintenance

b) Knowledge about essential National Health Programmes.

C. Practical and procedural skills.

a) General skills

1. General Medicine: History taking, methodological clinical examination, fundus examination, liver biopsy, L.P. sternal puncture for bone-marrow examination, catheterization and bedside investigations.
2. Cardiology: Interpretation of ECG in relation to respiratory diseases, Echo, usage of Defibrillator.
3. Radiology: X-ray reading, positioning, fluoroscopy, barium swallow, bronchography, CTcan and Ultra Sonography.
Optional: MRI, Lung Scan and Pulmonary-angiography.
4. ENT Anaesthesiology: Intubation, tracheostomy, transtrachial aspiration, sinus examination.
5. Paediatric Pulmonary diseases: Fluid and electrolyte balance in children.
6. Cardiovascular and Thoracic Surgery: Bronchoscopy, pulmonary resection, postoperative care and pre-operative evaluation.

These skills are acquired by the candidates by working in parent and allied departments.

b) Specific skills in Respiratory Medicine

1. Skill to perform diagnostic tests.

- Sputum examination with ZN stain, examination of the body fluids for AFBand malignant cells.
- FNAC
- Evaluation of diagnostic tests
- Sleep lab and sleep clinic
- Exercise testing
- Respiratory muscle function tests
- Pulmonary function test
- BCG Vaccination
- Montoux testing

2. Therapeutic Procedures;

- Thoracocentesis
- Tube Thoracostomy
- Rehabilitation exercise
- Postural drainage
- Bronchoscopy aspiration and lavage
- Plueral biopsy
- Critical care

- Management issues and basic nursing and asepsis, cross infection and iatrogenic problems.
- Life support system management
- Principles of total parenteral (TPS) nutrition.

Apart from these skills, the candidate should possess skill for rapid diagnosis and decision making which is useful in outpatient department and as a part of inpatient management, he/she should have the following skills.

- Case sheet writing, clinical examination, diagnosis, investigation and managements.
- Presenting cases.
- Problem based approach towards day-to-day management
- Bedside diagnostic and therapeutic procedures
- Minor surgical procedures
- Rehabilitation.

6. SUGGESTED MINIMUM CONTENTS

1. AN ARCHITECTURE FOR PHYSIOLOGICAL FUNCTION

- Development ultrastructure and Anatomy of Respiratory Tract and Lungs.
- Embryology of lungs, heart, mediastinum and diaphragm.
- Development anomalies.
- Surgical and endoscopic and applied anatomy of chest and neck including lymphatic drainage.
- Radiographic anatomy (plain skiagram, CT, MRI, Ultrasound, etc.)

2. PHYSIOLOGICAL PRINCIPLES

- Control of ventilation and role of peripheral and central chemoreceptors & pulmonary mechanics.
- Ventilation, Pulmonary Blood Flow, Gas Exchange, Blood Gas Transport and assessment of pulmonary functions.
- Non-respiratory immunological and endocrine functions of lung.
- Principles of ECG & ECHO.
- Inhalation kinetics and its implication in aerosol therapy, sputum induction etc.
- Acid-base and electrolytic balance.
- Physiology of sleep and their disorders.
- Respiratory reflexes including Cough reflex, lung defence including respiratory surfactant.

3. INTEGRATIONS AND ADAPTATIONS

- Homeostasis and Adaptation to High Altitude, Diving and Oxygen Limitation.
- Regulation and Adaptation of Ventilation in Metabolic Acidosis and Alkalosis, Respiratory Acidosis and Alkalosis.

4. APPROACH TO THE PATIENT WITH RESPIRATORY SIGNS AND SYMPTOMS

- Basic signs and symptoms of lung diseases.
- Pathogenesis evaluation of dysnoea and abnormal breathing patterns.
- Pulmonary manifestations of systemic diseases.

5. DIAGNOSTIC PROCEDURES

- Tracheo Bronchial Secretion/Transbronchial Aspirations
- Endoscopy and Related Procedures (Bronchoscopy: Thoracoscopy, Mediastinoscopy etc)
- ECG, ECHO in Pulmonary Diseases
- Radiographic Evaluation of the Chest and Computer Tomography and MRI
- Gram's stain, Zeihl-Neelsen stain for AFB, Fluroscent Microscope fungus stain, Gomori stain for p.carinii, pap smear for neoplastic cells and yersinia Pestis (Plague).
- Immunological Tests including Mantoux.
- Polymerase chain reaction, D.N.A probe, Bactec tests.
- Thoracocentesis, biopsy, FNAC/FNAB.
- Bronchography, Angiography/Digital Substraction/Embolization.
- Spirometry/ABG/Diffusion studies.

6. IMMUNOLOGICAL DISORDERS

- Immune defences of the lung and Cellular Communication in Respiratory Immunity
- Sarcoidosis
- Hypersensitivity Pneumonitis and Pulmonary Manifestations of Collagen-Vascular Diseases
- Eosinophilic Pneumonias and Tropical eosinophilia.
- Granuloma like Wegener's, Churg strauss etc.

7. INTERSTITIAL DISEASES

- Reactions of the Interstitial Space to Injury
- Pulmonary Fibrosis
- Occupational and Environmental Pulmonary Diseases

8. NON-INFECTIOUS DISORDERS OF THE PULMONARY PARENCHYMA

- Aspiration and inhalational (non-occupational) Disease of the Lung
- Pulmonary Edema
- Drug induced pulmonary diseases.

9. PULMONARY CIRCULATORY DISORDERS

- Pulmonary Hypertension and Cor Pulmonale
- Pulmonary Thromboembolic Disease
- Cardiac Problems in Pulmonary Patient and Pulmonary Diseases Produced by Cardiac Diseases
- Pulmonary Vasculitis

10. OBSTRUCTIVE DISEASES OF THE LUNGS

- Asthma: Epidemiology, General Features, Pathogenesis, Pathophysiology and Therapeutic modalities. Chronic Obstructive Pulmonary Diseases.
- Immunotherapy
- Long term Oxygen therapy
- Inhalation therapy
- Cystic Fibrosis
- Pulmonary Rehabilitation
- Acute Bronchiolitis and Bronchiolitis obliterans.
- Upper airway obstruction.
- Bronchiolitis Obliterans Organising Pneumonia (BOOP)

11. HYPOVENTILATION SYNDROMES AND SLEEP DISORDERS

- Disorders of Alveolar Ventilation
- Sleep Apnea Syndrome
- Obesity

12. NON-TUBERCULOUS INFECTIONS OF THE LUNGS: GENERAL ASPECTS

- Approach to Patient with Pulmonary Infections
- Nosocomial Pneumonias
- Systemic Infection and the Lungs

13. NON-TUBERCULOUS INFECTIONS OF THE LUNGS: SPECIFIC DISORDERS

- Pneumonias Caused by Gram-Positive Bacteria, Gram Negative Aerobic Organisms and Anaerobic Organisms and Anaerobic Infections of the Pleura
- Unusual Bacterial Pneumonias including viral or rickettsial
- Community-Acquired Pneumonia
- Bronchiectasis
- Atypical Pneumonias as Pneumonic Plague
- Fungal infections and Parasitic Infections of the Lungs
- Acquired Immunodeficiency Syndrome and Pneumonias in Immunocompromised Host including Fungal Infections.
- Principles Governing Use of Antibiotics in Pulmonary Infections
- Aspiration pneumonia
- Unresolved pneumonia
- Recurrent pneumonia

14. MYCOBACTERIAL DISEASES OF THE LUNGS

- Epidemiology, Microbiology and Prevention of Tuberculosis.
- Pathogenesis of Pulmonary Tuberculosis and clinical Manifestations and diagnosis of Mycobacterial Disease
- Diseases Caused by Mycobacteria Other than Mycobacterium Tuberculosis
- Treatment of Mycobacterial Diseases of the Lungs Caused by Mycobacterium Tuberculosis

- Revised National Tuberculosis Control Programme
- Treatment of pulmonary tuberculosis in hepatic, renal and endocrine disorders and in pregnancy.
- Multi Drug resistant tuberculosis.
- AIDS & tuberculosis.
- Chemoprophylaxes.

15. CANCER OF THE LUNGS

- Biology of the Lung Cancer: Small Cell and Non-small Cell
- Epidemiology, Pathology, Natural History and Clinical Picture of the Carcinoma of the Lung
- Diagnostic Approach to Pulmonary Nodules
- Small Cell Lung Cancer
- Medical Management and Surgical Treatment of Non-small Cell Lung Cancer and Paraneoplastic syndrome
- Radiation Therapy in the Management of the Carcinoma of the Lung
- Gene Therapy in Cancer Lung
- Benign and malignant Neoplasms of the Lung other than Bronchogenic Carcinoma, thymic and neuro fibromatous tumors. Neoplasms of the Pleura, Chest Wall, and Diaphragm
- Lymphoma and other RE cell malignancy.
- Dysproteinemia
- Prevention of Neoplasia

16. DISEASES OF THE MEDIASTINUM

- Non-neoplastic Disorders of the Mediastinum
- Primary Neoplasms and Cysts of the Mediastinum

17. DISORDERS OF THE PLEURA

- Pleural Dynamics and Effusions
- Nonneoplastic and Neoplastic Pleural Effusions
- Pneumothorax
- Pyothorax and Broncho-pleural fistula.
- Pleural thickening, fibrosis and calcification

18. ACUTE RESPIRATORY FAILURE

- Acute Respiratory Failure: Introduction and Overview
- Adult Respiratory Distress Syndrome: Clinical Features, Pathogenesis, Sequential Morphological Changes and Management
- Acute Respiratory Failure in the Patient with Obstructive Airways Disease
- Respiratory Muscles and Clinical Implications of Respiratory Muscle Fatigue
- Oxygen Therapy
- Respiratory and haemodynamic Monitoring in Acute Respiratory Failure
- Mechanical Ventilation
- Extracorporeal Membrane Oxygenation

- Principles of critical care.
 - Nutrition of the lung.
19. SURGICAL ASPECTS OF CHEST MEDICINE
- Pre- and Post-Operative Evaluation and Management of Thoracic Surgical Patient
 - Chest Trauma/Trauma related lung Dysfunction.
 - Lung Transplantation
20. PRACTICAL ASSESMENT OF PULMONARY PERFORMANCE
- Pulmonary Function Test and its Interpretations in Determining the Disability
 - Radionuclides in the Evaluation of Pulmonary Diseases
 - Spirometry, compliance, resistance, lung volume, diffusions.
 - Blood gas analysis
 - Cardiopulmonary exercise testing
 - Bronchoprovocation tests
 - Pulmonary angiography
21. OCCUPATIONAL LUNG DISORDERS:
- Organic and inorganic dust exposure and their effects.
 - Environmental dust measurements, radiation and lung, occupational asthma and occupational cancer.
 - Compensation and prevention
 - Acute disasters.
22. LUNG TRANSPLANTATION
23. RESEARCH & CLINICAL EPIDEMIOLOGY:
- Methodology of research (controlled trial, project planning, survey etc.)
 - Medical statistics
 - National tuberculosis programme
24. MISCELLANEOUS:
- Effects and Hazards of smoking and passive smoking and its prevention in individual and community.
 - Aerospace medicine
 - Demonstration and use of equipments (Ventilator, Bronchoscope, Capnography, Pulse-oxymeter etc.)
25. AGEING LUNG:
- Notes: Special problems of aged.
- All contents should include recent advances & relevance to National programme
 - Clinical part includes Epidemiology aspect also.
 - Social aspects respiratory medicine is an integral part of respiratory diseases & therefore to be included wherever necessary.

7. THESIS

Every candidate shall carry out work on an assigned research project under the guidance of a recognised Post Graduate Teacher, the result of which shall be written up and submitted in the form of a Thesis. Thesis shall be submitted at least six months before the Theory and Clinical / Practical examination. The thesis shall be examined by a minimum of three examiners; one internal and two external examiners, who shall not be the examiners for Theory and Clinical Examination. A candidate shall be allowed to appear for the Theory and Practical / Clinical examination only after the acceptance of the Thesis by the examiners.

Objectives

1. The student would be able to demonstrate capability in research by planning and conducting systematic scientific inquiry & data analysis and deriving conclusion.
2. Communicate scientific information for health planning.

Guide for thesis:

1. Chief guide will be from the concerned department.
2. Co-guide will be from the department or from other disciplines related to the thesis.

Submission of thesis protocol:

It should be submitted at the end of 3 months after admission to the course.

- 1) Protocol in essence should consist of:
 - a) Introduction and objectives of the research project.
 - b) Brief review of literature
 - c) Suggested materials and methods, and (scheme of work)
 - d) Statistician should be consulted at the time of selection of groups, number of cases and method of study. He should also be consulted during the study.
 - e) Bibliography
- 2) The protocol must be presented in the concerned department before being forwarded to the Research Committee of the Institute.
- 3) Protocol will be approved by the research committee appointed by the Dean / Principal to scrutinise the thesis protocol with reference to its feasibility, statistical validity, ethical (human/animal) aspects, etc.

Submission of thesis

1. The thesis shall relate to the candidate's own work on a specific research problem or a series of clinical case studies in accordance with the approved plan.
2. The thesis shall be written in English, printed or typed double line spacing, on white bond paper 22x28 cm with a margin of 3.5 cm, bearing the matter on one side of paper only and neatly bound with the title, the name of the Institute printed on the front cover.

3. The thesis shall contain: Introduction, review of literature, material and methods, observations, discussion, conclusion and summary and reference as per index medicus. Each candidate shall submit to the Dean four copies of thesis, through their respective Heads of the Department not later than 4 months prior to the date of commencement of theory examination in the subject.

Evaluation of Thesis:

1. The thesis shall be referred at least a minimum of three examiners – one internal and two external. The examiners will report independently to the Controller of Examinations and recommend whether the thesis is
 - a) approved
 - b) returned for improvements as suggested or
 - c) rejected (Reasons for rejection should be detailed)
2. The thesis shall be deemed to have been accepted when it has been approved by at least two examiners.
3. Where improvements have been suggested by two or more of the examiners, the candidate shall be required to re-submit the thesis, after making the requisite improvements for evaluation.
4. When a thesis is rejected by the examiners, it shall be returned to the candidate who shall have to write it again. The second thesis, as and when submitted shall be treated as a fresh thesis and processed.
5. Acceptance of thesis submitted by the candidate shall be a pre-condition for his / her admission to the written, oral and practical / clinical part of the examination.
6. There shall be no separate marks allotted for thesis.
Provided that under special circumstances if the report from one or more examiners is not received by the time the Post-Graduate examination is due, the candidate may be permitted provisionally to sit for the examination but the result be kept with held till the receipt of the report subject to the condition that if the thesis is rejected then the candidate in addition to writing a fresh thesis, shall have to appear in the entire examination again.
7. A candidate whose thesis stands approved by the examiners but fails in the examination, shall not be required to submit a fresh one if he / she appears in the examination in the same branch on a subsequent occasion

8. ASSESSMENT – INTERNAL AND FINAL

General Principles

- The assessment should be valid, objective, and reliable.
- It must cover cognitive, psychomotor and affective domains.
- Formative, continuing and summative (final) assessment should be conducted in theory as well as practicals/clinicals. In addition, thesis should be assessed separately.

Overall Weightage

Internal assessment - 20%

Final summative examination - 80%

Formative assessment

The formative assessment should be continuous as well as end-of-term. The former should be based on the feedback from the senior residents and the unit faculty concerned. End-of-term assessment should be held at the end of each semester (upto the 5th semester). Formative assessment will not count towards pass/fail at the end of the program, but will provide feedback to the candidate. Scheme of internal assessment examination It is held by means of a written test and practical (and or clinical) with viva examination by all consultants of the department as per distribution of marks as follows. In such five six monthly tests a candidate shall be evaluated for 1000 marks in total i.e. 200 marks in each term as follows.

Item	1st term	2nd term	3rd term	4th term	5th term
Theory	75 marks	75 marks	75 marks	75 marks	75 marks
Oral, Practical/clinical	75 marks	75 marks	75 marks	75 marks	75 marks
Log book evaluation	50 marks	50 marks	50 marks	50 marks	50 marks
Total	200 marks	200 marks	200 marks	200 marks	200 marks
Gross total	1000 marks				
Carried forward to Final MD/MS Examination	20 % marks ~ 200 marks				

200 marks shall be carried over a period of five terms as follows.

- Log book evaluation- 10 x 5terms= 50 marks
- Theory exam 15 x 5terms= 75 marks
- Oral ,Practical/Clinical exam 15 x 5terms= 75 marks

Evaluation of the Log book:

Each candidate should be required to maintain a log book in which following details will be entered and evaluated on a scale of 1 to 10. At end of each term of 6months of training for 5such terms the logbook will be evaluated and a score is to be calculated out from a maximum of 100 marks for the 10 items as entered in the logbook.

- i. skills learned independently, under supervision or assisted by him. 1 to 10
- ii. Presentations in journal clubs1 to 10.
- iii. Cases presented in clinical meetings 1 to 10
- iv. Presentation in departmental seminars..... 1 to 10
- v. Intra and interdepartmental training and evaluation details.....1 to 10
- vi. Teaching activities.....1 to 10
- vii. Conferences/workshops/CME attended 1 to 10
- viii. Papers presented/published conferences.....1 to 10

- ix. Didactic lectures attended.....1 to 10
- x. Thesis progress and evaluation details.....1 to 10

MD Examination:

Pattern of question for theory Papers- There shall be four theory papers. One paper out of these shall be on 'Basic Medical Sciences' and one paper on 'Recent Advances' in the discipline. There shall be 100 marks for each paper to be answered in 3 hours' time. There shall be '1 structured essay type question' for 20 marks besides 8 'short essay type questions' for 10 marks each in each paper.

Days of practical examination-Practical Examination should be conducted for a batch of upto 8 candidates over a minimum period of two to three days extendable up to 7days subject to the subject curriculum with due approval of the board of examiners. For a batch of more than 8 the examination may extend accordingly. The theory papers shall be evaluated at the examination center itself before commencement of the practical/clinical and oral examination in the subject during these practical examination days.

Components of examination-It consist of a written examination, a practical examination to assess the clinical/practical competencies and skills, and a viva voce examination.

- The examinations shall consist of
- A) theory
 - B) practical including clinical
 - C) oral

A.Theory-

The 4 papers in theory shall be conducted well in advance before the oral ,clinical/practical examination.

B. Practical

Clinical/Practical examination is the most important part of the evaluation and is aimed at assessing the clinical skills of the candidate and diagnostic reasoning. Entirely objective evaluation of these skills is neither feasible nor desirable. However, in order to test the various skills, the examiners may evaluate the candidates on a structured format, namely, history taking, physical examination, diagnostic reasoning, choice of diagnostic investigations, general management strategies, and general

attitude and demeanor towards the patient and the examiners. Patient material selected for examination is should be usually sufficiently representative of the type of patients for whom an internist may be called upon to give an opinion.

C. Pedagogic Skill

The candidate shall be allotted a topic from the discipline at a short notice of few hours, (preferably on the first day of the examination) to prepare and present before the board of examiners within a time span of 15 minutes (preferably on the second day of the examinations) . The teaching skill will be evaluated under various points(as illustrated below) and marks given accordingly.

- (i) Choice of article/topic (unless specifically allotted)
- (ii) Completeness of presentation
- (iii) Clarity of presentation
- (iv) Understanding of the subject and ability to convey the same
- (v) Whether relevant references have been consulted
- (vi) Ability to convey points in favour and against the subject under discussion
- (vii) Use of audio-visual aids
- (viii) Ability to answer questions
- (ix) Time scheduling
- (x) Overall performance

D. Viva-Voce

a.Viva-voce is expected to be conducted at every stage of the practical examination. The resident will be required to answer oral questions on any aspect of the specialty. Oral examination is designed to test the general scientific background of the candidate and his/her own particular contribution embodied by the thesis. A formal "grand viva-voce" may be held at the end of the practical examination. Questions on the thesis/dissertation may be asked at this time as well. The board of examiners will conduct the examination. They will read out the comments & questions and will seek the answers from the candidate. The viva voce should be assessed under the following headings:

1. Thesis viva voce
2. Grand viva voce

All examiners shall be jointly responsible for all parts of the examination. In presence of the external examiners, the Chairman of the conducting board shall make the necessary

arrangements for conducting the oral and practical including clinical examination at the department in the college centre .

b. The candidate shall bring the logbook and a copy of his/her thesis mandatorily while appearing for the oral, practical and clinical examination.

Marks for examinations: The examinations shall be organized on the basis of marking system to evaluate and certify candidate's level of knowledge, skill and competence as per distributions mentioned below. In total the overall assessment for a postgraduate shall be for 1000 marks distributed as follows.

A. Internal assessment exam (200 marks)

• Theory	15x5=75
• Practical (Oral, clinical and practical)	15x5=75
• Log book evaluation	10x5=50
Total :	40x5=200

B. Final MD/MS exam (800 marks)

• Theory (100 x 4 Papers)	400
• Oral ,Clinical/Practical	400
I) Clinical/Practical	(300 marks)
Long exercise (one)	80 marks
Short exercise (three)	120 marks
OSPE(ten)	40 marks
Spots(ten)	40 marks
Pedagogic skill	20 marks
II) Viva	(100 marks)
Thesis Viva	20 marks
Grand Viva	80 marks

Grand Total	(A+B)=	1000 marks
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PASS/FAIL- In order to pass the examination in each subject a candidate must secure not less than 50% marks in each head of passing which shall include (1) Theory (2) Practical including clinical and viva voce examination (3) internal assessment examination.

Pattern of Questions;-

- There shall be 4 papers with 100 marks for 3 hours duration of examination each.
- There shall be 100 marks for each paper to be answered in 3 hours' time. There shall be '1 structured essay type question' for 20 marks besides 8 'short essay type questions' for 10 marks each in each paper.
- The chapter distribution for the papers shall be as follows.

MD Examination

- paper-I : basic sciences related to pulmonary medicine
- paper-II : tuberculosis
- paper-III : respiratory disorders other than tuberculosis
- paper-IV : recent advances related to pulmonary medicine including critical care, immunology and environmental pollution.

Sample questions

PAPER I – BASIC SCIENCES RELATED TO PULMONARY MEDICINE

Time: Three hours Maximum : 100 marks

Attempt all question

Use illustration and flowcharts wherever necessary

Write short answers on: (10 X 10 = 100)

1. Describe with diagrams the ultra structure of cilia in Respiratory Tract. What are the common development defects encountered? Describe ciliary dysknetic diseases?
2. Adventitious lung sounds
3. Measurement of small airway function
4. Oncogenes and lung cancer
5. Antitussives
6. TH₂ Cells
7. Tumor Necrosis Factor
8. Pulmonary vasodilators
9. Levofloxacin
10. Capnography

PAPER II – TUBERCULOSIS

Time: Three hour Maximum: 100 marks

Attempt all questions. Use illustration and flowcharts wherever necessary

1. Discuss the clinical features, diagnosis, complication and management of Tuberculous meningitis. (20 marks)
2. Write short notes on: (10X8=80 marks each)
 - a) Electron microscopic structure of Mycobacteria.
 - b) Diagnosis of atypical mycobacterial infection?
 - c) Role of surgery in TB
 - d) Lupus vulgaris
 - e) MGIT

PAPER III – NON –TUBERCULOSIS RESPIRATORY DISEASES

Time: Three hour Maximum: 100 marks

Attempt all questions. Use illustration and flowcharts wherever necessary

1. What is the pathogenesis of Chronic Bronchitis and Emphysema? How will you treat? Acute Exacerbation of Chronic Bronchitis - What are the likely future medications for treating COPD? (6+10+4=20 marks)

3. Write briefly about :(10marksx8=80marks)
- Fibrinolytic and irrigation therapy in empyema?
 - Friedlander's Pneumonia.
 - Hamman Rich Syndrome
 - Devise a management plan for Pulmonary Artery hypertension?
 - Complications of Mechanical Ventilation?

PAPER IV –RECENT ADVANCES IN PULMONARY MEDICINE INCLUDING CRITICAL CARE, IMMUNOLOGY AND ENVIRONMENTAL POLLUTION

Time: Three hour Maximum: 100 marks

Attempt all question

Use illustration and flowcharts wherever necessary

- What are the neuromuscular diseases of chest? Elaborate on diagnosis and management? (10 + 10 marks)
- Explain briefly: (10marksx8=80marks)

- National Emphysema Treatment Trial
- Thoracoscopy
- Partial liquid ventilation
- Diagnosis and management of avian flu
- Relationship between smoking and ILD.

9. Suggested list of books and journals

Sl. No.	Books	Author	Edition
1	Tuberculosis	Rom and Gary	Latest
2	Principle of Chest X-ray Diagnosis	George Simon	Latest
3	Text book of Pleural Diseases	Richard W Light	Latest
4	Diagnostic Bronchoscopy	Peter Stadling	Latest
5	Respiratory Diseases	Crofton and Douglas	Latest
6	Pulmonary Diseases & disorder (Vol-1 & 2)	A P Fishman	Latest
7	Fundamental of Chest Roentgen logy	Felson	Latest
8	Synopsis of Diseases of Chest	Fraser	Latest
9	Tuberculosis	Sharma & Mohan	Latest
10	Macleods clinical Examination	Douglas	Latest
11	Tuberculosis Management	Toman	Latest
12	TB Hand Book	WHO	Latest
13	Harrison's Principles of Internal Medicine		Latest
14	Text Book of Respiratory Medicine	Murray & Nadel	Latest
15	The ICU Book	Paul Marino	Latest
16	Pharmacology & Pharmaco therapeutics(Vol-1 & 2)	Satoskar & Bhandarkar	Latest
17	Text book of Preventive & Social Medicine	J.E.Park	Latest

LIST OF RECOMMENDED JOURNALS

- 1) Indian Journal of Chest Diseases and Allied Sciences
- 2) Indian Journal of Tuberculosis
- 3) Lung India
- 4) Chest
- 5) American Journal of Respiratory and Critical Care Medicine
- 6) Thorax
- 7) International Journal of Union Against Lung Diseases & Tuberculosis

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**Syllabus and Curriculum
for
MD – RADIO DIAGNOSIS
2012**

Preamble

The purpose of this programme is to standardize Radio-diagnosis teaching at Post Graduate level through out the country so that it will benefit in achieving uniformity in undergraduate teaching as well and resultantly creating competent radiologist with appropriate expertise.

Programme Objectives

The objective is to train a student to become a skilled and competent radiologist to conduct and interpret various diagnostic / interventional imaging studies (both conventional and advanced imaging), to organize and conduct research and teaching activities and be well versed with medical ethics and legal aspects of imaging intervention.

Specific Learning Objectives

A resident on completing his/her MD (Radiodiagnosis) should be able to

1. Acquire good basic knowledge in the various sub-specialties of radiology such as Neuro- radiology, GI-radiology, Uro- radiology, vascular- radiology, musculoskeletal, Interventional radiology, Emergency radiology, Pediatric radiology and Mammography.
2. Independently conduct and interpret all routine and special radiologic and imaging investigations.
3. Provide radiological services in acute emergency & trauma including its medico legal aspects.
4. Elicit indications, diagnostic features and limitation of applications of ultrasonography, CT and MRI and should be able to describe proper cost-effective algorithm of various imaging techniques in a given problem setting.
5. Perform various image guided interventional procedures for diagnosis and therapeutic management.
6. Undertake further specialization in any of the above mentioned branches in Radiodiagnosis such as Gastrointestinal radiology, Uro-radiology, Neuro radiology, Vascular radiology, musculoskeletal radiology, Interventional
7. Imparting training in both conventional radiology & modern imaging techniques so that the candidate is fully competent to practice, teach and do research in the broad discipline of radiology including ultrasound, Computed tomography and Magnetic Resonance Imaging.

Postgraduate Training

The training is spread over 3 years and includes following components:

- 1.Theory Lectures for Radiation Physics.
- 2.Rotational posting in various sub-specialties.
- 3.Seminars, case discussion, journal club.
- 4.Research methodology and thesis.

Clinical Sciences

Training in different organ systems:

Various Diseases involving the following systems (A Student should have adequate knowledge of procedures and interpretation of all conventional and advanced imaging techniques and interventions whenever needed).

1. **Musculo Skeletal System** - Interpretation of diseases of muscles, soft tissue, bones and joints including congenital, inflammatory, traumatic, metabolic and endocrine, neoplastic and miscellaneous conditions.
2. **Respiratory System** - Disease of the chest wall, diaphragm, pleura and airway; pulmonary infections, pulmonary vasculature; pulmonary neoplasm; diffuse lung disease; mediastinal disease, chest trauma; post - operative lung and X-ray in intensive care.
3. **Cardiovascular System** - Diseases and disorder of cardiovascular system (congenital and acquired conditions) and the role of imaging by conventional radiology, ultrasound, colour Doppler, CT, MRI, Angiography and Isotopes Studies.
4. **Gastro intestinal tract and hepato** - biliary pancreatic system - Diseases and disorders of mouth, pharynx, salivary glands, esophagus, stomach, small intestine, large intestine, diseases of omentum, peritoneum and mesentery: acute abdomen, abdominal trauma. Disease and disorders of hepato-biliary pancreatic system.
5. **Urogenital System** - Various diseases and disorders of genitor - urinary system. These includes: congenital, inflammatory, traumatic, neoplastic, calculus disease and miscellaneous ,degenerative,metabolic & misclaneous conditions.
6. **Central Nervous System** (C.N.S.) includes imaging (using conventional and newer methods) and interpretation of various diseases and disorders of the head, neck and spine covering, congenital, infective, vascular, traumatic neoplastic degeneration metabolic & miscellaneous condition.
7. **Radiology of Emergency Medicine.**
8. **Radiology of Obstetric and Gynecology.**
9. **Evaluation of Breast by imaging and interventions.**
10. **ENT, EYES, Teeth.**
11. **Endocrine glands.**
12. **Clinical applied radio nuclide imaging.**
13. **Interventional radiology related to different systems of body.**

During each posting, candidate should be able to perform the procedures and interpret the findings.

During the three-year course, the student will work in the following areas :-

1.	Conventional Chest	2 Months
2.	Conventional Musculoskeletal including skull, Spine PNS	2 Months
3	G.U.	2 Months
4	G.I.T.	2 Months
5	US including Doppler	4 Months
6	CT (Body + Head - 3 months each)	2 Months
7.	Emergency Radiology	2 Months
8	M.R.I.	2 Months
9	Interventional Radiology including	3 Months
1	Nuclear Medicine	1 Month
11	Elective posting	2 Months
	Total	24 Months

PROPOSED SCHEDULE FOR ROTATION OF RESIDENTS

1 ST Year (PG 1/4)	Chest	Musculo-Skeletal	Chest	Musculo-Skeletal	G.U.	US
	CT	G.U.	G.I.T.	G.I.T.	Emg.	US
2 nd Year (PG 3/4) (PG 4/4)	US	US	CT	Emg.	MRI	Intervention
	MRI	Intervention	Intervention	Elective	Elective	Elective

ASSESSMENT:-

General Principles

- The assessment should be valid, objective, and reliable.
- It must cover cognitive, psychomotor and affective domains.
- Formative, continuing and summative (final) assessment should be conducted in theory as well as practicals/clinicals. In addition, thesis should be assessed separately.

Overall Weightage

Internal assessment - 20%

Final summative examination - 80%

Formative assessment

The formative assessment should be continuous as well as end-of-term. The former should be based on the feedback from the senior residents and the unit faculty concerned. End-of-term assessment should be held at the end of each semester (upto

the 5th semester). Formative assessment will not count towards pass/fail at the end of the program, but will provide feedback to the candidate. Scheme of internal assessment examination It is held by means of a written test and practical (and or clinical) with viva examination by all consultants of the department as per distribution of marks as follows. In such five six monthly tests a candidate shall be evaluated for 1000 marks in total i.e. 200 marks in each term as follows.

Item	1st term	2nd term	3rd term	4th term	5th term
Theory	75 marks	75 marks	75 marks	75 marks	75 marks
Oral, Practical/clinical	75 marks	75 marks	75 marks	75 marks	75 marks
Log book evaluation	50 marks	50 marks	50 marks	50 marks	50 marks
Total	200 marks	200 marks	200 marks	200 marks	200 marks
Gross total	1000 marks				
Carried forward to Final MD/MS Examination	20 % marks ~ 200 marks				

200 marks shall be carried over a period of five terms as follows.

- Log book evaluation- 10 x 5terms= 50 marks
- Theory exam 15 x 5terms= 75 marks
- Oral ,Practical/Clinical exam 15 x 5terms= 75 marks

Evaluation of the Log book:

Each candidate should be required to maintain a log book in which following details will be entered and evaluated on a scale of 1 to 10. At end of each term of 6months of training for 5such terms the logbook will be evaluated and a score is to be calculated out from a maximum of 100 marks for the 10 items as entered in the logbook.

- i. skills learned independently, under supervision or assisted by him. 1 to 10
- ii. Presentations in journal clubs1 to 10.
- iii. Cases presented in clinical meetings 1 to 10
- iv. Presentation in departmental seminars..... 1 to 10
- v. Intra and interdepartmental training and evaluation details.....1 to 10
- vi. Teaching activities.....1 to 10
- vii. Conferences/workshops/CME attended 1 to 10
- viii. Papers presented/published conferences.....1 to 10
- ix. Didactic lectures attended.....1 to 10
- x. Thesis progress and evaluation details.....1 to 10

MD Examination:

Pattern of question for theory Papers- There shall be four theory papers. One paper out of these shall be on 'Basic Medical Sciences' and one paper on 'Recent Advances' in the discipline. There shall be 100 marks for each paper to be answered in 3 hours' time. There shall be '1 structured essay type question' for 20 marks besides 8'short essay type questions' for 10 marks each in each paper.

Days of practical examination-Practical Examination should be conducted for a batch of upto 8 candidates over a minimum period of two to three days extendable up to 7days subject to the subject curriculum with due approval of the board of examiners. For a batch of more than 8 the examination may extend accordingly. The theory papers shall be evaluated at the examination center itself before commencement of the practical/clinical and oral examination in the subject during these practical examination days.

Components of examination-It consist of a written examination, a practical examination to assess the clinical/practical competencies and skills, and a viva voce examination.

The examinations shall consist of

- A) theory
- B) practical including clinical
- C) oral

A.Theory-

The 4 papers in theory shall be conducted well in advance before the oral , clinical/practical examination.

B. Practical

Clinical/Practical examination is the most important part of the evaluation and is aimed at assessing the clinical/practical skills of the candidate and diagnostic reasoning. Entirely objective evaluation of these skills is neither feasible nor desirable. However, in order to test the various skills, the examiners may evaluate the candidates on a structured format.

C. Pedagogic Skill

The candidate shall be allotted a topic from the discipline at a short notice of few hours, (preferably on the first day of the examination) to prepare and present before the board of examiners within a time span of 15 minutes (preferably on the second day of the examinations) . The teaching skill will be evaluated under various points(as illustrated below) and marks given accordingly.

- (i) Choice of article/topic (unless specifically allotted)
- (ii) Completeness of presentation
- (iii) Clarity of presentation
- (iv) Understanding of the subject and ability to convey the same
- (v) Whether relevant references have been consulted
- (vi) Ability to convey points in favour and against the subject under discussion
- (vii) Use of audio-visual aids
- (viii) Ability to answer questions
- (ix) Time scheduling
- (x) Overall performance

D. Viva-Voce

a.Viva-voce is expected to be conducted at every stage of the practical examination. The resident will be required to answer oral questions on any aspect of the specialty. Oral examination is designed to test the general scientific background of the candidate and his/her own particular contribution embodied by the thesis. A formal "grand viva-voce" may be held at the end of the practical examination. Questions on the thesis/dissertation may be asked at this time as well. The board of examiners will conduct the examination. They will read out the comments & questions and will seek the answers from the candidate. The viva voce should be assessed under the following headings:

1. Thesis viva voce
2. Grand viva voce

All examiners shall be jointly responsible for all parts of the examination. In presence of the external examiners, the Chairman of the conducting board shall make the necessary arrangements for conducting the oral and practical including clinical examination at the department in the college centre .

b. The candidate shall bring the logbook and a copy of his/her thesis mandatorily while appearing for the oral, practical and clinical examination.

Marks for examinations: The examinations shall be organized on the basis of marking system to evaluate and certify candidate's level of knowledge, skill and competence as per distributions mentioned below. In total the overall assessment for a postgraduate shall be for 1000 marks distributed as follows.

A. Internal assessment exam(200 marks)		
• Theory		15x5=75
• Practical (Oral, clinical and practical)		15x5=75
• Log book evaluation		10x5=50
Total :		40x5=200
B. Final MD/MS exam (800 marks)		
• Theory (100 x 4 Papers)		400
• Oral ,Clinical/Practical		400
I) Clinical/Practical		(300 marks)
Long exercise (one)		80 marks
Short exercise (three)		120 marks
OSPE(ten)		40 marks
Spots(ten)		40 marks
Pedagogic skill		20 marks
II) Viva		(100 marks)
Thesis Viva		20 marks
Grand Viva		80 marks
Grand Total	(A+B)=	1000 marks

PASS/FAIL- In order to pass the examination in each subject a candidate must secure not less than 50% marks in each head of passing which shall include (1) Theory (2) Practical including clinical and viva voce examination (3) internal assessment examination.

Pattern of Questions;-

The PG examination shall be carried out in three parts:-

a. Theory :-

- There shall be 4 papers with 100 marks for 3 hours duration of examination each.
- There shall be 2 structured essay type questions for 15 marks each along with 7 short answer type questions for 10 marks each in each paper.
- The chapter distribution for the papers shall be as follows.

paper-I : basic sciences related to radiology including anatomy, pathology, basic and radiation physics, imaging techniques, dark room processing.,

paper-II : systemic radiology covering cardiovascular, respiratory, gastrointestinal, endocrine, chest, mammography.

paper-III : systemic radiology covering genitourinary, retroperitoneum, central

nervous system, head and neck, musculoskeletal, obstetric and gynaecology, ENT, eye, interventional radiology.

paper-IV : recent advances, nuclear medicine, radiology related to clinical specialities.

b) Practical

- I. One Long Case
- II. Two Short problem solving Cases
- III. Film Quiz (50 spots)
- IV. Radiation Physics
- V. Catheters and contrast
- VI. Radiological procedures
- VII. Gross Pathology

COURSE CONTENTS

A Physics, Apparatus, Photography and Film Faults

- Introduction of general properties of radiation and matter Fundamentals of nuclear physics and radioactivity.
 - Production of x-rays
 - X-ray Generating Apparatus
 - Interaction of x-rays and gamma rays with matter and their effects on irradiated materials.
 - Measurement of X and gamma rays
 - Interaction of x-ray with the patient
 - The Radiological Image
 - The Image Receptor
 - Contrast Enhancement
 - Radiation hazards and protection
 - Quality Assurance
 - Fundamentals of electromagnetic radiation
 - Characteristic properties of X-rays.
 - X-ray equipments
 1. Conventional equipments.
 2. Fluoroscopy - Conventional and Imaging Intensifier.
 3. Advanced equipments US, CT, MRI, Doppler, Angiography, Cine Fluoroscopy and Cine Angiography
 - Quantity Assurance & evaluation of performance of X-Ray equipments.
 - Contrast Media - types, chemical composition, mechanism of action, dose schedule, route of administration, adverse reaction and their management.
 - Nuclear Medicine: Equipments and isotopes in various organ systems and recent advances in the field of nuclear medicine.
 - Picture archiving and communication system (PACS) and Radiology information system (RIS) to make a film less department, Telemedicine, Digital Imaging.
 - Recent advances in radiology and imaging.
- B. Practical Schedule - Physics**
- Film characteristics
 - Effectiveness of Lead Apron and other protective Devices
 - Beam parameters check

- Optical Radiation field alignment
- Assessment of Scatter radiation
- Quality control of x-rays and Imaging equipments
- Evaluation of performance of a film processing unit.

C. Practical radiography and Dark room technique

- Dark room techniques
- Radiography of the extremities
- Radiography of the spine, abdomen, pelvic girdle and thorax
- Radiography of the skull
- Contrast techniques and interpretation of GI tract, biliary tract, etc.
- Contrast techniques and interpretation of the C.N.system
- Contrast techniques and interpretation of the Cardiovascular system including chest.
- Miniatureradiography, Macro-radiography and magnification techniques
- Dental and portable radiography

D. ANATOMY

Gross and cross sectional Anatomy of all the body systems.

E. PATHOLOGY

Gross morphology of pathological condition of systemic diseases.

F. RADIOLOGY-COURSE CONTENTS

1. Bones and joints
2. Respiratory system
3. Cardiovascular system
4. Gastro intestinal tract
5. Urogenital tract
6. C.N.S. including spine
7. Radiology of obstetric and Gynaecology
8. ENT, EYES, Teeth, Soft tissue breast
9. Endocrine glands
10. Clinically applied radionuclide imaging
11. Contrast Agents

Contrast Media, their types, formulations, mechanisms of action, dose schedule, routes of administration, adverse reactions and their management.

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