

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY

No. 69, ANNA SALAI, GUINDY, CHENNAI – 600 032.

D.M. / M.Ch

SUPER SPECIALITY DEGREE COURSES



SYLLABUS AND CURRICULUM

2017-2018

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI

PREFACE

The Syllabus and Curriculum for the Super Speciality D.M / M.Ch Degree Courses have been revamped with the experts from the concerned specialities so as to impart high quality state of art training thereby setting higher standards.

The Students passing out of this Prestigious University shall recognize the health needs of the community and carry out professional obligations ethically and keeping with the objectives of the National Health Policy.

The Students have to master most of the competencies, pertaining to the speciality, that are required to be practiced at secondary and the tertiary levels of the health care delivery system. The Students should be aware of the contemporary advances and developments in the discipline concerned. The Students should acquire a spirit of scientific inquiry and to be oriented to the principles of Research Methodology and Epidemiology. They should also acquire basic skills in teaching of the Medical and Paramedical Professionals.

(Subject to changes in Amendments in MCI Regulations [www.mciindia.org] and SAB Resolutions)

**Prof Dr. S. GEETHALAKSHMI.,M.D.,Ph.D.,
VICE-CHANCELLOR**

Comments/feedback are welcome if any and mail it to registrar@tnmgrmu.ac.in

SYLLABUS AND CURRICULUM
SUPER SPECIALITY – D.M. / M.Ch

Sl.No.	Specialities
1	DM - NEUROLOGY
2	DM - NEPHROLOGY
3	DM – MEDICAL GASTROENTEROLOGY
4	DM - MEDICAL ONCOLOGY
5	DM - RHEUMATOLOGY
6	DM - CLINICAL HAEMATOLOGY
7	DM - NEONATOLOGY
8	DM - HEPATOLOGY
9	DM - ENDOCRINOLOGY
10	DM - CARDIOLOGY
11	DM - VIROLOGY
12	DM - PULMONARY MEDICINE
13	DM - INFECTIOUS DISEASE
14	DM - INTERVENTIONAL RADIOLOGY
15	DM – CRITICAL CARE MEDICINE
1	M.Ch - CARDIO VASCULAR AND THORACIC SURGERY
2	M.Ch – NEURO SURGERY
3	M.Ch - PLASTIC AND RECONSTRUCTIVE SURGERY
4	M.Ch - UROLOGY
5	M.Ch - PAEDIATRIC SURGERY
6	M.Ch - SURGICAL ONCOLOGY
7	M.Ch - VASCULAR SURGERY
8	M.Ch – ENDOCRINE SURGERY
9	M.Ch - SURGICAL GASTROENTEROLOGY
10	M.Ch - HAND SURGERY
11	M.Ch - GYNAECOLOGICAL ONCOLOGY
12	M.Ch - HEPATO PANCREATO BILIARYSURGERY

D.M. – NEUROLOGY

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI
Syllabus - D.M. NEUROLOGY

1.AIMS:

The aim of the course is to impart thorough and comprehensive training to the candidate in the various aspects of the specialty.

2.OBJECTIVES:

1. To function as Faculty/consultants in the specialty
2. To plan and set up independent Neurology Unit catering to clinical, investigative and management Neurology
3. To carry out and help in conducting applied research in Neurosciences..

3.THEORY SYLLABUS:

1. **Neuro Anatomy:** It includes anatomy of central and peripheral nervous system and muscles including microscopic appearance, relevant embryology and its application to be related developmental disorders.
2. **Neuro Physiology:** Physiology of central and peripheral nervous system and muscles.
3. **Neuro Biochemistry:** The normal biochemistry of the nervous system and muscles; and its application in different neurological disorders.
4. **Neuro Pathology:** Pathology of different diseases affecting the nervous system and muscles, including macroscopic appearances.
5. **Neuro-bacterio-virology:** With special reference to the various neurological Disorders.
6. **Neuro Genetics:** Normal as well as the abnormalities in different genetically inherited neurological disorders.
7. **Biostatistics and Clinical Epidemiology:** Fundamentals of biostatistics, ability to conduct a clinical trial independently and interpret the final reports.
8. **Neuro Immunology:** Normal and various abnormalities, seen in neuro Immunological disorders.
9. **Neuro Psychiatry:** Related neuropsychiatric disorders such as non-epileptic Seizure etc.
10. **Neuro Psychology.**
11. **Pediatric Neurology.**

12. **Neuro Radiology** including plain X-ray, CT scan, Angiogram, Magnetic Resonance Imaging, Myelogram etc.

13. **Electrophysiology:** Electrophysiology, nerve conduction studies, EEG including sleep EEG and Video EEG, evoked potentials Transcranial Doppler, Sleep lab including polysomnography.

14. Other Neurology oriented investigatory procedures in relation to neurology /Neuro ophthalmology etc.

15. **Neurosurgery.**

16. **Clinical Neurology.**

17. **Neuro Pharmacology** of various neurological disorders.

18. **Bioethics** and Health Communication.

Bioethics

1. Respect human life and the dignity of every individual.
2. Refrain from supporting or committing crimes against humanity and condemn all such acts.
3. Treat the sick and injured with competence and compassion and without prejudice and apply the knowledge and skills when needed.
4. Protect the privacy and confidentiality of those for whom we care and breach that confidence only when keeping it would seriously threaten their health and safety or that of others.
5. Work freely with colleagues to discover, develop, and promote advances in medicine and public health that ameliorate suffering and contribute to human well being.
6. Educate the public about present and future threats to the health of humanity.
7. Advocate for social, economic, educational and political changes that ameliorate suffering and contribute to human well being.
8. Teach and mentor those who follow us, for they are the future of our caring profession.

4. CLINICAL TRAINING

1. Case discussions
2. Bed side demonstrations
3. Tutorials
4. Group discussions
5. Workshops

6. Lectures

Ist YEAR:

During the first year, the student will be working fully in the Department of Neurology. In the morning time, he / she will be familiarized with clinical neurology, neurological examination, localization and differential diagnosis, relevant laboratory and radiological investigations and pharmacotherapeutics. He / she will attend all the outpatient services and get himself / herself aware of the common neurological problems. In addition, he / she will work in the electrophysiology laboratories and get himself /herself fully with EMG, evoked potential and electroencephalography (EEG). He / she should be competent to handle the equipments and report independently. In the afternoon, he / she will concentrate on the basic sciences and will undertake the research study within three months after admission.

IInd YEAR:

During II year, students are encouraged to undergo special postings for learning new advanced techniques / Procedure / Skills in institutions of higher repute where the requisite facilities are available without affecting the duties of the parent department.

Following will be the subject and duration of training:-

Neuropathology – 15 days.

Neuro-radiology– 15 days.

Interventional Neuro-radiology / Deep Brain Stimulation – 15 days.

Intensive Care in Neurology – 15 days.

Psychiatry – 15 days.

Paediatric Neurology – 30 days.

Neurosurgery – 30 days.

The Neurosurgery posting is applicable where neurology and neurosurgery department are separate and with independent H.O.Ds functioning independently. The posting of neurology postgraduates to neurosurgery and vice versa will be decided by the corresponding Head of the department.

IIIrd YEAR:

During the period, the candidate will work in the Neurology department concentrating on clinical and theoretical neurology, clinical psychiatric relevant investigations and medical as well as Para medical management of the patients. Besides, he shall handle and report the EEG and EMG by himself.

5. SKILL TRAINING REQUIREMENTS:

1. EEG
2. EMG
3. Neuroradiology
4. Journal club
5. Seminars
6. Teaching Medicine, Psychiatry, Physiology, Rehabilitation Medicine, Pediatric

residents if available as a part of training.

6. TEACHING METHODOLOGY:

1. Ward / OPD patient management.
2. Peri operative Management
3. Assisting / performing operative procedures.
4. Long and short topic presentations.
5. Ward rounds, case presentations and discussions. Combined ward rounds with Medical Gastroenterologist.
6. Clinicoradiological and clinicopathological conferences.
7. Inter-departmental Periodical meeting on relevant topics with Department of Anatomy, Physiology, Bio-chemistry and Microbiology, Radiology, Pathology etc.
8. Journal club.
9. Research review.
10. Problem solving sessions.
11. Weekly Tumour Board discussions with Radiation and Medical Oncologist.
12. Guest and in-house lectures. Conferences, seminars and CME's.
13. Participation in workshops, etc.
14. Teaching undergraduates / postgraduates / paramedical staff.
15. Weekly Surgical audit (patient care review meeting)
16. Biomedical equipments use and maintenance.

7. RESEARCH WORK:

The candidate will be trained in the ability to

- Frame a research question.
- Plan a study to answer the question.
- Collect the relevant information and
- Evaluate appropriately the collected data to draw a conclusion.

The candidate should become conversant with the reporting of these results as a research paper, in journals and as a presentation in conferences.

The activities would consist of:

Planning and organizing relevant animal / clinical studies to be submitted as a dissertation at the end of the course.

Students should compulsorily attend the Research Methodology workshop conducted by the University within first six months of D.M Course.

8. LOG BOOK:

The Postgraduate student of a Postgraduate Degree Course in Super specialties shall maintain Log Book of the work carried out by them and the training

programme undergone during the period of training including details of surgical operations assisted or done independently by.

The Log Book shall be checked and assessed by the faculty members imparting the training.

Periodical evaluation of Log Book to be done by the Head of the Department as per 52nd SAB.

The Evaluation of the candidates in both theory and practical aspects will help the candidate in the improvement of his/her knowledge skills & attitude.

9. COMPETENCY ASSESSMENT:

Overall:

1. Communication / Commitment / Contribution / Compassion towards patients and Innovation	-	10 Marks
2. Implementation of Newly learnt techniques	-	10 Marks
3. Documentation of case sheets / discharge Summary / Review	-	10 Marks
4. Number of cases presented in Clinical Meetings/ Journal Clubs / Seminars / Papers presented in Conference.	-	10 Marks
5. No. Of Medals/ Certificates won in the conference / Quiz competitions and other academic meetings with details.	-	10 Marks
Total		50 Marks

Assessment	I	- February	-	First Year
	II	- August	-	First Year
	III	- February	-	Second Year
	IV	- August	-	Second Year
	V	- February	-	Third Year
	VI	- May	-	Third Year

VIVA INCLUDING COMPETENCY ASSESSMENT – 100 Marks (50+50)

10.THEORY EXAMINATION:

PAPER - I	Basic Sciences (Consisting of Neuro anatomy, Neuro Physiology, Neuro chemistry, Neuro Pathology, Neuro Microbiology,
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	Parasitology, Immunology, Epidemiology and Genetics
PAPER -II	Neurology, Neuro Psychiatry, NeuroPsychology, Paediatric Neurology
PAPER -III	Neuro Radiology, Electro Physiology Neuro Otology, Neuro Ophthalmology and Other Investigatory Procedures
PAPER - IV	Recent Advances in Neurology

Each paper will contain:

1. Essay questions (2)	-	2 X 15	=	30 Marks
2. Short Notes (10)	-	10 X 7	=	70 Marks

Total				100 Marks

11. CLINICAL EXAMINATION:

Particulars	Time for candidate to examine the cases	Time for examiners to question the candidates	Maximum Marks
Long Case	1 Case x 60 Minutes	60 Minutes	100
Short Case	2 Cases x 15 Minutes	30 Minutes	100
Ward Rounds	3 Patients x 10 Minutes	30 Minutes	100
OSCE	5 Stations x 3 Minutes	15 Minutes	50
Viva Voce		15 Minutes	100
Log Book			50
Total			500

As per Medical Council of India Post Graduate Medical Education Regulations 2000 (amended upto 10th August 2016) clause **13.9 A Postgraduate student of a Postgraduate degree Course in broad specialties/ Super Specialties would be required to present one poster presentation to read one paper at a National/State conference and to present one Research paper which should be published/accepted for publication/sent for publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate Degree Examination.**

Apart from Poster/Oral paper presentation in National/State conferences, the Research paper published by the candidate in the University Journal of Medical Sciences will be considered as equivalent to the Research Paper as mentioned in 13.9. clause. Case Reports can also be published in University Journal of Medical Sciences but case

reports will not be considered as Research Paper.

The candidate can also present Research Paper as per Clause 13.9 of Post Graduate Education Regulation 2000, and if the article sent for publication by the candidate as primary author or corresponding author which has not yet been published/accepted for publication, the candidate should submit a letter from the HOD, stating that the article sent for publication is of publishable merit and the proof of the Research Article submitted to the Journal for publication should be sent to the university forwarded through the HOD [as per 53rd SAB]

The student can submit articles for the University journal anytime from the time of registration in the University till 6 months prior to theory examination.

12.OSCE: (5 Stations)

1. EEG
2. Gross Pathology
3. Microscopy
4. Nerve conduction study
5. Evoked Potentials / Neuroradiology

13. REFERENCE BOOKS:

The editions are as applicable and the latest edition should be the part of the syllabi

1. Bradley's Neurology in Clinical practice, 7th edition. 2015.
2. Adams and Victor's Principles of Neurology, 10th edition. 2014
3. Harrison's Principles of Internal Medicine, 19th edition. 2015.
4. Dejong's The Neurologic Examination, 7th edition. 2013
5. Localisation in Clinical Neurology, Jose Biller and Paul W. Brazis, 6th edition, 2011
6. Caplan's Stroke: A Clinical Approach, 5th edition. 2016.
7. Neurology: A Queen Square Textbook. 2nd edition.
8. Principles and Practice of Movement Disorders, Joseph Jankovic, 2nd edition. 2011.
9. Oxford Textbook of Cognitive Neurology and Dementia, Masud Husain and Jonathan M. Schott. 2016.
10. Merritt's Neurology, 13th edition. 2015

11. Osborn's Brain – Imaging, Pathology and Anatomy, 1e, 2012

****Note:** The editions are as applicable and the latest editions shall be the part of the syllabi.

14. JOURNALS:

1. Continuum: Lifelong learning in Neurology
2. Neurologic Clinics of North America
3. New England Journal of Medicine
4. Current Opinion in Neurology
5. Nature Reviews Neurology
6. Lancet Neurology
7. Annals of Indian Academy of Neurology
8. Neurology India
9. Brain
10. JAMA Neurology
11. Practical Neurology, BMJ
12. Journal of Neurology, Neurosurgery and Psychiatry, BMJ
13. Muscle and Nerve.

D.M. - NEPHROLOGY

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI
Syllabus – D.M NEPHROLOGY

AIMS AND OBJECTIVES:

- (i) The DM course in Nephrology is designed to train the candidates with the objectives to impart a thorough knowledge in the subject as well as practical skills required to work as an independent consultant in the field of Nephrology and impart knowledge and skills to their students.
- (ii) The Training is also intended to develop in them the art of effective communication and enthusiasm in updating information.
- (iii) The training also imparts knowledge in research methodology and evokes interest in research.

THEORY SYLLABUS:

I. ANATOMY:

- 1. Gross Anatomy Embryology Histology including Electron Microscopy study of the Kidney.

II. PHYSIOLOGY:

- 1. Renal circulation and Glomerular ultrafiltration.
- 2. Solute transport / Both Organic and inorganic.
- 3. Renal Acidification.
- 4. Urine Concentration & Dilution.
- 5. Role of Kidney in Blood pressure regulation.
- 6. Endocrine and Autocrine functions of the kidney.

III. INTEGRATED CONTROL OF BODY FLUID VOLUME AND COMPOSITION:

- 1. Vasoactive peptides / Arachidonic Acid Metabolites.
- 2. Sodium – Water Balance.
- 3. Potassium Balance
- 4. Acid Base Balance
- 5. Calcium and Phosphorus Metabolism.
- 6. Magnesium metabolism.
- 7. Renal Handling of Uric acid

IV. APPROACH TO THE PATIENT WITH KIDNEY DISEASE:

- 1. Approach to the patient with Kidney Disease
- 2. Laboratory Assessment of Kidney Disease including Biopsy

3. Interpretation of Electrolyte and Acid – Base Parameters in Blood and Urine
4. Adaptation to Nephron Loss
5. Renal and Systemic Manifestations of Glomerular Disease.
6. Diagnostic Kidney Imaging
7. Interventional Nephrology

V. EPIDEMIOLOGY OF KIDNEY DISEASE:

1. Epidemiology of Kidney Disease
2. Risk Factors and Kidney Disease
3. Nephron Endowment
4. Gender and Kidney Disease
5. Aging and Kidney Disease

VI. DISORDERS OF KIDNEY FUNCTION

1. AKI – Pathogenesis / Diagnosis / Therapy
2. Glomerular disease – Primary and Secondary
3. Micro and Macro Vascular Diseases of the kidney
4. Tubulo Interstitial Diseases
5. UTI / Pyelo Nephritis / Reflux Nephropathy
6. Urinary tract obstruction and Obstructive Nephropathy
7. Diabetic Nephropathy
8. Nephrolithiasis
9. Renal Neoplasia
10. Kidney disease in tropics
11. Pregnancy and Kidney diseases.

VII. INHERITED DISEASES OF THE KIDNEY:

1. Inherited Disorders of Podocyte Function
2. Inherited Disorders of the Renal Tubule
3. Cystic Diseases of the Kidney

VIII. PAEDIATRIC NEPHROLOGY

1. Developmental Nephrology
2. Congenital diseases of the kidneys, ureters, urinary bladder and urethra.
3. Glomerular and tubular diseases
4. Systemic diseases affecting the kidney
5. Acute and Chronic Kidney Failure
6. Dialysis and Transplantation with respect to Pediatric Nephrology.

IX. HYPERTENSION AND KIDNEY :

1. Primary and Secondary Hypertension
2. Renovascular Hypertension and Ischemic Nephropathy
3. Hypertension and Kidney Disease in Pregnancy
4. Antihypertensive Drugs
5. Diuretics

X. CHRONIC KIDNEY DISEASE:

1. Pathophysiology of Uremia and its Systemic manifestation

- i. Pathophysiology of Uremia
- ii. Cardiovascular Aspects of Chronic Kidney Disease
- iii. Hematologic Aspects of Kidney Disease
- iv. Endocrine Aspects of Kidney Disease
- v. Neurologic Aspects of Kidney Disease
- vi. Mineral Bone Disorders in Chronic Kidney Disease.
- v. Continuous Renal Replacement Therapy (CRRT)

2. Conservative and Pharmacological management:

- i. Diet and Kidney Disease
- ii. Specific Pharmacologic Approaches to Clinical Renoprotection
- iii. Erythropoietin Therapy in Renal Disease and Renal Failure
- iv. Vitamin D, Calcimimetics, and Phosphate Binders
- v. Prescribing Drugs in Kidney Disease

3. Invasive Management.

- i. Hemodialysis
- ii. Peritoneal Dialysis
- iii. Intensive Care Nephrology
- iv. Plasmapheresis
- v. Extracorporeal Treatment of Poisoning

XI. RENAL TRANSPLANTATION

1. Transplantation Immunobiology
2. Donor and Recipient Issues
3. Clinical Management

XII. RECENT ADVANCES

- i. Attaining Immunologic Tolerance
- ii. Xenotransplantation
- iii. Tissue Engineering and Regeneration
- iv. Stem Cells in Renal Biology and Medicine

Bioethics

1. Respect human life and the dignity of every individual
2. Refrain from supporting or committing crimes against humanity and condemn all such acts
3. Treat the sick and injured with competence and compassion and without prejudice and apply the knowledge and skills when needed.
4. Protect the privacy and confidentiality of those for whom we care and breach that confidence only when keeping it would seriously threaten their health and safety or that of others
5. Work freely with colleagues to discover, develop, and promote advances in medicine and public health that ameliorate suffering and contribute to human well being
6. Educate the public about present and future threats to the health of humanity
7. Advocate for social, economic, educational and political changes that ameliorate suffering and contribute to human well being.
8. Teach and mentor those who follow us, for they are the future of our caring profession.

CLINICAL TRAINING

The students will be clinically trained in parent department during the 3 years course.

POSTINGS:

1. Male Ward	-	7 Months
2. Female Ward	-	7 Months
3. Hemodialysis Unit	-	5 Months
4. Transplantation	-	7 Months
5. CAPD	-	2 Months
6. Interventional Nephrology	-	2 Months

The specified period of postings is minimum required. The duration of postings may vary with the number of Post Graduates.

Special Postings

(a) Pediatric Nephrology Department	-	2 Months
(b) Radiology	-	15 days
(c) Rheumatology including Immunology	-	15 days
(d) Lab Services	-	1 Month
(e) Postings in Nephrology Department of other centers	-	2 months

During II year, students are encouraged to undergo special postings for learning new advanced techniques / Procedure / Skills in institutions of higher repute where the requisite facilities are available without affecting the regular work of the parent department.

SKILL TRAINING:

DIALYSIS

(a) HEMODIALYSIS

The candidates will be posted in Hemodialysis units in rotation where he or she will be trained in both technical and clinical aspects of Hemodialysis including double lumen venous catheterization, Dialyzer reuse etc. They will also be trained in Continuous Renal Replacement Therapy (CRRT) – mode of dialytic therapy in critically ill patients.

The candidates will also be trained during this period in plasmapheresis and Hemoperfusion.

(b) PERITONEAL DIALYSIS

All candidates will be trained to perform acute intermittent Peritoneal Dialysis including its benefits and complications. Apart from that they will be trained in the management of Continuous Ambulatory Peritoneal Dialysis (CAPD) patients.

INTERVENTIONAL NEPHROLOGY

1. The post graduates are trained in the placement of permanent tunneled catheter for patients planned to undergo HD.
2. The post graduates are trained in the placement of percutaneous CAPD catheterization.
3. The post graduates are also trained in performing USG guided needle biopsy of both native and transplant kidney.
4. The post graduates are also exposed to procedure of AVF creation.

RENAL TRANSPLANTATION

The candidates will be trained in the workup of living kidney donors and recipients and prepare recipients for Renal Transplantation, manage them post operatively in the immediate and long term follow up.

They will also be trained in wait listing the appropriate Chronic Renal Failure (CRF) patients without living donors, preparing them for Renal Transplantation as and when the cadaver renal donor is available and managing them post operatively.

TEACHING METHODOLOGY

(i) The candidates will work in the department under the guidance of Assistant Professors, Associate Professors and Professors. They will be trained in the decision making process both in clinical and investigative aspects of nephrology. The candidates shall work taking up the responsibility of investigative and therapeutic management of patients under the guidance of senior teachers in nephrology.

(ii) The candidates will attend nephrology out patient department and Renal transplant OP. The candidates will write case sheets of the new patients and discuss the problems of old patients with Associate Professor and Professor of Nephrology.

(iii) As part of training in order to enhance decision making skills, Post graduates will perform in house duties in turns.

(iv) The candidates will be posted in the wards including transplant and dialysis departments for a stipulated period for which they are primarily responsible to take decisions in investigating and managing these patients, under the guidance of Assistant Professors, Associate Professors and Professors.

The faculty members of department will be primarily responsible for teaching. In addition the following departments will be involved in the teaching Programme of DM Nephrology Post Graduates.

- a. Urology
- b. Radio Diagnosis

- c. Pathology including Immuno Pathology
- d. Microbiology

The teaching schedule will be as follows, however the details may change time to time depending on the evolving circumstances.

S.NO.	TEACHING EXERCISE	FREQUENCY
1.	Nephrology Grand Rounds	Once a week
2.	Clinical Bed side discussions	Once a week
3.	Seminars	Once in 2 weeks
4.	Journal Club	Once in 2 weeks
5.	Topic review	Once in 2 weeks
6.	Short Topic discussion	4 days per week
7.	Renal Histo pathology discussion	once a week
8.	Nephrology - Internal Medicine case discussion	Once a week
9.	Nephrology case discussion	Once in 2 weeks
10.	Renal Radiology Rounds	Once in 2 weeks
11.	Nephro Urology Clinic	Once in 2 weeks

The Teaching Programme will include:

- 1. Urology Lectures
- 2. Lectures in Statistics
- 3. Diet in Renal Disease

RESEARCH WORK

The candidate is introduced to the field of research in Nephrology; both at clinical and laboratory level.

The candidate will be trained in the ability to

- Frame a research question.
- Plan a study to answer the question.
- Collect the relevant information and
- Evaluate appropriately the collected data to draw a conclusion.

The candidate should become conversant with the reporting of these results as a research paper, in journals and as a presentation in conferences.

The activities would consist of:

Planning and organizing relevant studies to be submitted as a Research paper at the end of the course. The topics for research and presentation should be finalized and ethical committee approval should be obtained by the end of first year of the course.

Students should compulsorily attend Research methodology workshop conducted by the University within first six months of D.M. Course.

LOG BOOK:

The Postgraduate student of a Postgraduate Degree Course in Super specialties shall maintain Log Book of the work carried out by them and the training programme undergone during the period of training including details of surgical operations assisted or done independently.

The Log Book shall be checked and assessed by the faculty members imparting the training.

Periodical evaluation of Log Book to be done by the Head of the Department.

The Evaluation of the candidates in both theory and practical aspects will help the candidate in the improvement of his/her knowledge skills & attitude.

COMPETENCY ASSESSMENT:

Overall:

1. Communication / Commitment / Contribution / Compassion towards patients and Innovation	-	10 Marks
2. Implementation of Newly learnt techniques	-	10 Marks
3. Documentation of case sheets / discharge Summary / Review	-	10 Marks
4. Number of cases presented in Clinical Meetings/ Journal Clubs / Seminars / Papers presented in Conference.	-	10 Marks
5. No. Of Medals/ Certificates won in the conference / Quiz competitions and other academic meetings with details.	-	10 Marks

	Total	50 Marks

Assessment	I	- February	-	First Year
	II	- August	-	First Year
	III	- February	-	Second Year
	IV	- August	-	Second Year
	V	- February	-	Third Year
	VI	- May	-	Third Year

VIVA INCLUDING COMPETENCY ASSESSMENT – 100 Marks (50+50)

THEORY EXAMINATION

Paper I : Nephrology – Basic Sciences

Paper II : Clinical Nephrology, Dialysis, Transplantation

Paper III : Nephrology - Dialysis & Transplantation

Paper IV: : Recent Advances

Each paper will contain:

1. Essay questions (2)	-	2 X 15	=	30 Marks
2. Short Notes (10)	-	10 X 7	=	70 Marks
Total				100 Marks

CLINICAL EXAMINATION:

Particulars	Time for candidate to examine the cases	Time for examiners to question the candidates	Maximum Marks
Long Case	1 Case x 60 Minutes	60 Minutes	100
Short Case	2 Cases x 15 Minutes	30 Minutes	100
Ward Rounds	3 Patients x 10 Minutes	30 Minutes	100
OSCE	5 Stations x 3 Minutes	15 Minutes	50
Viva Voce		15 Minutes	100
Log Book			50
Total			500

As per Medical Council of India Post Graduate Medical Education Regulations 2000 (amended upto 10th August 2016) clause **13.9 A Postgraduate student of a Postgraduate degree Course in broad specialties/Super Specialties would be required to present one poster presentation to read one paper at a National/State conference and to present one Research paper which should be published/accepted for publication/sent for publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate Degree Examination.**

A part from Poster/Oral paper presentation in National/State conferences, the

Research paper published by the candidate in the University Journal of Medical Sciences will be considered as equivalent to the Research Paper as mentioned in 13.9. clause. Case Reports can also be published in University Journal of Medical Sciences but case reports will not be considered as Research Paper.

The candidate can also present Research Paper as per Clause 13.9 of Post Graduate Education Regulation 2000, and if the article sent for publication by the candidate as primary author or corresponding author which has not yet been published/accepted for publication, the candidate should submit a letter from the HOD, stating that the article sent for publication is of publishable merit and the proof of the Research Article submitted to the Journal for publication should be sent to the university forwarded through the HOD [as per 53rd SAB]

The student can submit articles for the University journal anytime from the time of registration in the University till 6 months prior to theory examination.

OSCE: (5 Stations)

1. Clinical Scenario - 2 stations
2. Hemodialysis scenario
3. Arterial Blood gas/dyselectrolytemia interpretation
4. Pathology slide/specimen
5. Radiology

REFERENCE BOOKS:

1. Schrier's Diseases of the Kidney - ninth edition
2. Brenner & Rector's The Kidney – tenth Edition
3. Comprehensive Clinical Nephrology (Johnson, Feehally) – Fifth Edition
4. Principles and Practice of Dialysis (Henrich) – Fourth Edition
5. Kidney Transplantation (Peter. J. Morris) – Seventh Edition

****Note:** The editions are as applicable and the latest editions shall be the part of the syllabi.

JOURNALS RECOMMENDED:

1. Indian Journal of Nephrology
2. American Journal of Kidney Diseases
3. Journal of American Society of Nephrology
4. Clinical Journal of American Society of Nephrology
5. American Journal of Transplantation
6. Kidney International
7. Nephrology Dialysis Transplantation
8. Hemodialysis International
9. Peritoneal Dialysis International
10. Nature Reviews Nephrology
11. Clinical Kidney Journal.

D.M. – MEDICAL GASTROENTEROLOGY

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI
Syllabus – D.M- MEDICAL GASTROENTEROLOGY

1. AIM:

At the end of the course the student should have acquired:

1. Broad understanding of the principles of Basic Medical Sciences related to his/her specialty.
2. Ability and skill to perform and interpret investigative procedures related to the specialty.
3. Skills in clinical diagnosis, planning of investigation and manage common conditions in the specialty by relevant current therapeutic methods.
4. Capabilities to take independent decisions in emergency situations, perform required procedures in that particular specialty and manage complications.
5. Competence in intensive care with practical knowledge of work with resuscitative and monitoring equipments.
6. Ability to critically appraise published literature, interpret data and to broaden his/her knowledge by keeping abreast with modern developments in the specialty.
7. Ability to teach Post-graduates, undergraduates and Nursing students in the basic management of the diseases in his/her specialty.
8. Ability to get acquainted with allied and general clinical disciplines to ensure appropriate and timely referral.
9. Ability to conduct research
10. Ability to become a consultant and capability of organizing specialty Departments.

2.OBJECTIVES:

- i) Broad knowledge base – ability to generate a relevant differential diagnosis based on an accurate history and physical examination as well as understanding of indications and contraindications for diagnostic and therapeutic procedures.
- ii) Practical Training including advanced diagnostic, therapeutic and Laboratory Techniques relevant to the specialty.
- iii) Ability to think critically.

- iv) Skill at performing procedures
- v) Ability to communicate effectively with patients and referring physicians
- vi) Appreciation of humanistic (compassionate, cost conscious, service oriented) and ethical aspects (accountability integrity) of medicine.
- vii) Ability to work as part of a team as gastrointestinal disease involves multidisciplinary management.

3.THEORY SYLLABUS:

I ACID PEPTIC DISEASE

1. Anatomy, physiology of esophagus, stomach, duodenum.
2. Gastric secretion and measurement of acid secretion.
3. Gastritis and gastropathie.
4. Pathophysiology, epidemiology, diagnosis, complications and therapy of peptic ulcer.
5. Role of H.pylori and NSAIDs in acid peptic diseases.
6. Gastro-esophageal reflux disease – Epidemiology, Pathogenesis, Clinical features, diagnosis, complications and treatment.

Training Methodology

1. Out patient management of patients with peptic ulcer, GERD, gastritis (supervised)
2. Training in upper GI endoscopy – Elective and emergency. Treatment of upper GI bleed.
3. Interpretation of radiological studies.
4. Interpretation of mucosal biopsies of esophagus, stomach and duodenum.
5. Study of textbooks, journals, seminars: Endoscopy videolibrary and articles.

II Motility, Diverticular disease and Functional illness

1. Esophageal, gastric, small intestinal and colonic sensory and motor physiology
2. Pathogenesis, clinical assessment and treatment of motor disorders of esophagus, stomach, small intestine and colon.
3. Recognise manometric features of major motor disorders of esophagus and anal sphincter
4. Able to assess significance of results of pH test.
5. Pathophysiology, diagnosis and management of Functional bowel disease –

- a) Physiology of brain-gut axis, visceral sensation
- b) Role of neurotransmitters in sensory and motor functions
- c) Use of psychopharmaceuticals in treatment of Functional bowel disorders
- 6. Etiopathogenesis, clinical features, diagnosis and management of diverticular disease.
- 7. Acute and chronic pseudo-obstruction
- 8. Able to interpret motility studies of esophagus and ano-rectum.

Training methodology

- 1. See and manage patients with motility disorders – interpreting tests results, decision making after appropriate tests, and planning treatment (under supervision).
- 2. Study of textbooks, journal articles, seminars and motility tracings.

III GASTROINTESTINAL INFLAMMATION, ENTERIC AND INFECTIOUS DISEASES

- 1. Mucosal immunology and mechanisms of gastrointestinal inflammation.
- 2. Composition and function of normal enteric flora
- 3. Prevalence, clinical presentation and virulence factors of gastrointestinal pathogens (viral, bacterial, fungal, protozoal)
- 4. Pathophysiology of diarrhoeal disorders – Intestinal water and electrolyte transport
- 5. Infectious enteritis, proctocolitis and bacterial food poisoning.
- 6. Antibiotic associated diarrhea, pseudomembranous entero-colitis and *Cl.difficile* associated diarrhea and colitis.
- 7. Intestinal protozoa
- 8. Intestinal worms – Nematodes, cestodes, trematodes.
- 9. Etiopathogenesis, pathology, clinical features, diagnosis, complication and therapy of gastrointestinal tuberculosis.
- 10. Epidemiology, etiopathogenesis, pathology, clinical features, diagnosis, complications and treatment (medical / surgical) of ulcerative colitis and Crohns disease, cancer surveillance. New biological therapies.
- 11. IBD and pregnancy – therapy and genetic counseling. Psycho-social influences of IBD on individual and family.

12. Infections in immunocompromised hosts (HIV, transplant patients).
13. Hepatic inflammation (e.g. liver abscess, cholangitis).
14. Prevention of infection – Vaccines, hygiene practices etc.
15. Gastrointestinal, hepato-biliary and pancreatic disorders in patients with AIDS.
16. Collagenous colitis, Microscopic colitis.
17. Management of patients on ambulatory care (OP) and hospitalized patients (IP) –
 - Follow up patients with long term disease (e.g IBD)
 - Counseling of families
 (make a DD, interpret diagnostic studies, implement a therapeutic plan and manage on long term follow up)
18. Training in upper / lower GI endoscopy
19. Interpret radiological studies and mucosal biopsies.

To learn

1. Interpret stool exams – ova, parasites
2. Know how to perform stool culture, fluid culture
3. Antigen detection in stool and fluid (Enzyme immuno assay fluorescent antibody)
4. Rapid diagnostic tests (DNA probe / PCR)
5. Single and double balloon enteroscopy

IV MALDIGESTION & MALABSORPTION

1. Digestion and absorption of nutrients and vitamins
2. Maldigestion and malabsorption
 - Etiopathogenesis, approach to evaluation and approach to management
3. Tropical malabsorption
 - Tropical enteropathy; Tropical sprue
 - Parasites
4. Epidemiology, pathology, pathogenesis, diagnosis, complications and management of celiac sprue, Refractory sprue
5. Whipples disease
6. Short bowel syndrome – Etiology, pathophysiology, complications & management

(medical / surgical)

7. Protein losing enteropathy
8. Management under supervision of OP / IP patients including follow up of these patients.
9. Interpret radiological studies and mucosal biopsy

V. GASTROINTESTINAL MALIGNANCY

1. Cellular growth and neoplasia (Tumour biology)
2. Gastrointestinal lymphomas
3. GI stromal tumours
4. GI carcinoid tumours and carcinoid syndrome
5. Endocrine tumours of pancreas and GI tract
6. Epidemiology, biology, genetics, clinical features, diagnosis, pathology, staging, screening and surveillance and therapy (surgery / RT / chemo / targeted therapies – neoadjuvant / adjuvant / palliative / endoscopic) and prognosis for esophageal, gastric, small bowel, colonic, hepatic, gall bladder, bile duct and pancreatic tumours.
7. Colonic polyps and polyposis syndrome
8. Prevention of malignant tumours
 - a) Surveillance & screening
 - b) Endoscopic resection of premalignant lesions – polyps, Barretts esophagus (ablation).
 - c) Chemoprevention
 - d) Diet / genetic counseling
9. Radiation injury to gastrointestinal tract
10. Genetic studies in diagnosis, therapy and prognostication
11. Endoscopic management of Barretts esophagus (Photodynamic therapy)
12. Endoscopic treatment techniques for early gastric cancer (e.g) EMR
13. Endotherapy for palliation of esophageal, gastric, pancreatic, biliary tumours
14. EUS – Diagnosis (FNAC), staging, therapy (celiac block in carcinoma pancreas)
15. Principles of chemotherapy and radiation for early and advanced tumours.

VI BILIARY TRACT AND PANCREATIC DISEASES

A. Biliary tract disease:

1. Anatomy and developmental anomalies
2. Bile secretion, factors regulating secretion and enterohepatic circulation.
3. Biliary tract – Motor function and dysfunction (sphincter of Oddi Dysfunction).
4. Epidemiology, pathophysiology, etiology, clinical features, diagnosis, predictors of severity, complications and therapy of acute pancreatitis.
5. Epidemiology, etiology, pathophysiology, clinical factors, diagnosis, complication and therapy of chronic pancreatitis; Tropical calcific pancreatitis
6. Pancreatic cancer, cystic tumours of pancreas and Neuro endocrine / Non endocrine pancreatic tumours
7. Hereditary, familial and genetic disorder and pancreatic disorder of childhood
8. Therapeutic ERCP – for biliary and pancreatic diseases
9. EUS – performance and interpretation
10. Evaluate bile for microlithiasis

VII HEPATOLOGY

1. Anatomy, Embryology and developmental abnormalities of liver
2. Biology and pathobiology – Genetic markers, immunology, virology
3. Liver chemistry and function tests
4. Diagnosis and management of patients with
 - a) Acute hepatitis – viral, drug, toxic
 - b) Fulminant hepatic failure – cerebral edema, coagulopathy and other complications
 - c) Chronic hepatitis and cirrhosis
 - d) Complications of liver disease – ascites, encephalopathy, SBP, hepatorenal syndrome, bleeding varices and gastropathy
 - e) Hepatocellular carcinoma
 - f) Non viral causes of liver disease – Alcohol, NAFLD, Wilsons disease, PBC, Autoimmune hepatitis, hemochromatosis, α -1 antitrypsin deficiency
 - g) Bacterial, parasitic and fungal infections including liver abscess

- h) Vascular diseases – Budd chiari syndrome, veno-occlusion disease
- i) Drug induced liver disease
- 5. Use of anti-viral and immunosuppressive agents in treatment of liver disease
- 6. Selection and care of patients awaiting and following liver transplantation – understanding of immunosuppressive agents, diagnosis and management of rejection, management of infections and biliary tract and vascular complications.
- 7. Management of nutritional problems in patients with liver disease
- 8. Interpretation of liver imaging modalities and limitations of each modality
- 9. Interpretation of liver histopathology
- 10. Basic knowledge of pediatric and congenital hepatobiliary disorders
- 11. Skills in performing liver biopsy, therapeutic paracentesis (minimum number 20 each), understanding indication, contraindications, limitations, complications, interpretation of results.

VIII GASTROINTESTINAL ENDOSCOPY

Skills:

- 1. Esophago-gastro-duodenoscopy – biopsy
- 2. Therapy of variceal and non variceal upper GI bleed
- 3. Colonoscopy and polypectomy
- 4. Esophageal dilatation – wire guided / non wire guided Savary Gillard / CRE / pneumatic dilatation for Achalasia cardia.
- 5. Diagnostic ERCP

Cognitive

- 1. Understanding of indications, contraindications and complications.
- 2. Ability to interpret results of endoscopy
- 3. Ability to recommend an endoscopic procedure based on clinical, lab and imaging data.
- 4. Ability to integrate endoscopy findings and therapy into patient management plan
- 5. Ability to recognize personal limits while performing procedures and know when to request help.
- 6. Knowledge of side effects of sedation and how to treat them.

7. Knowledge of antibiotic prophylaxis for endoscopy
8. Knowledge of infections and bleeding complications and how to manage them.

Endoscopy Training:

- 1) Threshold number of procedures to be performed before competence is assessed
(minimum number of procedures)

1. Esophago-gastroduodenoscopy	150
2. a) Therapy of non variceal haemorrhage (active bleed 10)	25
b) Variceal haemorrhage (active bleed 5)	20
3. Esophageal dilatation	20
4. Flexible sigmoidoscopy	30
5. Colonoscopy	150
6. Snare polypectomy / homeostasis	20
7. Assisting in ERCP Procedure	25

- 2) Maintain a log book of all procedures performed

3) Chronological Exposure:

- Skills to be achieved under supervised training

I year - Upper GI endoscopy / biopsy

- 1 - Flexible sigmoidoscopy
- 2 - Cognitive understanding as described above
- 3 - Know how about the cleaning/Disinfection and drying of the scopes.
- 4 - Liver biopsy, large volume paracentesis

II year - Therapy of variceal and non variceal upper GI bleed

- 1 - Colonoscopy, polypectomy
- 2 - Dilatation of esophageal strictures, pneumatic dilatation for achalasia cardia

III year - Knowledge on and observation of the following procedures:

1. ERCP
2. Manometry

3. pH
4. Capsule Endoscopy
5. EUS – Endoscopic Ultrasound

IX NUTRITION

1. Basic nutritional concepts
2. Assessment of nutritional status including specific nutritional deficiencies and excesses.
3. Metabolic response to starvation and patho-physiological effects of under nutrition.
4. Re-feeding syndrome
5. Metabolic response to illness and injury and nutritional requirements during stress.
6. Implementation and management of nutritional therapy including modified diets, external tube feeding and parenteral nutrition.
7. Patho-physiology and clinical management of obesity
8. Ethical and legal issues involved in providing and withdrawing nutritional support for terminally ill patients.
9. Placement of naso-jejunal tubes and PEG/PEJ.
 10. Nutrition management of non-gastrointestinal disease
 11. Managing patients with home parenteral nutrition

X GASTROINTESTINAL AND HEPATIC PATHOLOGY

1. Appreciate and recognize spectrum of normal histology
2. Recognize histo-pathological changes in gastrointestinal and hepatic disorders.
3. Overview of special techniques and special status
 - (eg) a. Immuno histochemistry – viral infections, pre malignant and malignant lesions
 - b. Flow cytometry
 - c. tests based on molecular biology – PCR, insitu hybridisation

XI GASTROINTESTINAL RADIOLOGY

1. a. Knowledge of appropriate choice of imaging techniques for specific problem in GI and Hepatic disease after evaluating

- cost-effectiveness and

- risk-benefit

b. Understand logical sequence of using these techniques

2. Recognise normal anatomy of alimentary tract and related organs.

3. Ability to evaluate and interpret plain film, radiographs, barium studies of GI tract, CT, ultrasound, MRI, scintigraphy, PET, vascular studies.

4. Ability to perform ultrasound abdomen

5. Familiar with radiation safety practices.

XII GI SURGERY

1 a. Whether surgery is necessary; if indicated what kind of operation; when it should be performed, common complications and long term consequences of the following surgical procedures:

- Antireflux procedures, peptic ulcer surgery, caustic injury to upper GI tract, hernias and gastric volvulus, abscess and fistulas, hepatobiliary operations, portosystemic shunts, hepatic resections and liver transplantation, surgery for IBD, surgery for pancreatic and biliary diseases, surgery for malignant disease of GI tract

2. a) Surgery vs Endoscopy vs Interventional radiology – which procedure, where?

b) Laparoscopy vs open surgery

XIII PAEDIATRIC GASTROENTEROLOGY

1) Congenital disorders of gastrointestinal system, liver, biliary tract and pancreas

2) Age related physiological and psychological variables of children

3) Unique aspects of disease in paediatric age group as compared to adult

XIV GERIATRIC GASTROENTEROLOGY

(As part of General Training)

General Issues:

1. a) Impact of age on presentation, diagnosis and treatment of important gastrointestinal conditions.

- b) Impact of depression and dementia on presentation and treatment.
- c) Pathophysiology of aging
- d) Social and ethical issues

Geriatric gastroenterology

1. Changes of G.I. function with aging, (e.g.) slowing of colonic motility and rectal dysfunction
2. Changes in drug metabolism
3. Effect of aging on nutrition
4. GI problems in institutionalized and bedridden patients (e.g) fecal impaction as risk factor for urine incontinence.

XV WOMENS HEALTH ISSUES IN DIGESTIVE DISEASES

(As part of General Training)

1. General women health issues
 - a) Doctor-patient relationships
 - b) Cultural and religious issues
 - c) Psycho-social issues
 - d) Lab values and diagnostic tests
 - Gender differences as well as changes during pregnancy in normal lab values
2. Specific women health issues
 - a) Health and disease states – gender difference in demographics, epidemiology, pathophysiology, clinical presentation.
 - b) Effect of menstrual cycle and menopause on digestive disease
 - c) Pharmacokinetics of medications – differences in absorption, metabolism and therapeutic response.
3. Pregnancy and child bearing
 - a) GI and liver changes / disorders in normal pregnancy
 - b) Effect of pre-existing GI and liver disorders on pregnancy and fertility.
 - c) Impact of pregnancy on gastrointestinal & liver disease
 - d) GI and liver disorders unique to pregnancy
 - e) Maternal-fetal transmission of infections and appropriate management of mother and infant

.

f) Pharmacokinetics and interactions of medications during pregnancy and breast feeding
-potential harm to foetus.

g) Nutritional requirements

Post-partum issues

Rectal prolapse, haemorrhoids, urinary / fecal incontinence

XVI CELLULAR AND MOLECULAR PHYSIOLOGY

Knowledge of fundamental concepts in

1. Cell biology
2. Molecular biology
3. Genetics
4. Immunology including basic transplant biology
5. Pharmacology and cellular signalling
6. Host-environment interactions
7. Understanding basics of techniques - PCR, Genetic screening, Recombinant technology /Micro-array, flowcytometry.
8. Gastrointestinal hormones and neurotransmitters

Bioethics

1. Respect human life and the dignity of every individual.
- 2 Refrain from supporting or committing crimes against humanity and condemn all such acts.
- 3 Treat the sick and injured with competence and compassion and without prejudice and apply the knowledge and skills when needed.
- 4 Protect the privacy and confidentiality of those for whom we care and breach that confidence only when keeping it would seriously threaten their health and safety or that of others.
- 5 Work freely with colleagues to discover,develop, and promote advances in medicine and public health that ameliorate suffering and contribute to human well being.

- 6 Assessment of both theory and practicals at the end of every unit posting. Educate the public about present and future threats to the health of humanity.
- 7 Advocate for social, economic, educational and political changes that ameliorate suffering and contribute to human well being.
- 8 Teach and mentor those who follow us, for they are the future of our caring profession.

4. CLINICAL TRAINING

The Students will be clinically trained in parent department during the 3 years course.

First Year:

Gastroenterology : 7 months and three weeks

Paediatric Gastroenterology: 1 month

Gastro Radiology : 10 days

Gastro Pathology : 7 days

Intensive Medical Care : 7 days

Surgical Gastroenterology : 15 days

Endoscopy : 2 month

Note : MD Paediatric Candidates should attend General medical wards for one month.

Second Year:

Gastroenterology : 8 months

Endoscopy : 3 months

Liver Transplant Centre : One month

During II year, students are encouraged to undergo special postings for learning new advanced techniques / Procedure / Skills in institutions of higher repute where the requisite facilities are available without affecting the duties of the parent department.

Third Year:

Gastroenterology : 6 months

Endoscopy : 5 months

Posting in Centre doing more advanced GE work: 1 month

5. SKILL TRAINING:

I ACID PEPTIC DISEASE

1. Out patient management of patients with peptic ulcer, GERD, gastritis (supervised)
2. Training in upper GI endoscopy – Elective and emergency. Treatment of upper GI bleed.
3. Interpretation of radiological studies.
4. Interpretation of mucosal biopsies of esophagus, stomach and duodenum.

II Motility, Diverticular disease and Functional illness

1. See and manage patients with motility disorders – interpreting tests results, decision making after appropriate tests, and planning treatment (under supervision).

III GASTROINTESTINAL INFLAMMATION, ENTERIC AND INFECTIOUS DISEASES

1. Management of patients on ambulatory care (OP) and hospitalized patients (IP) –
 - Follow up patients with long term disease (e.g IBD)
 - Counseling of families(make a DD, interpret diagnostic studies, implement a therapeutic plan and manage on long term follow up)
2. Training in upper / lower GI endoscopy
 - Interpret radiological studies and mucosal biopsies.
3. Interpret stool exams – ova, parasites
4. Know how to perform stool culture, fluid culture
5. Antigen detection in stool and fluid (Enzyme immuno assay fluorescent antibody)
6. Rapid diagnostic tests (DNA probe / PCR)
7. Single and double balloon enteroscopy

IV MALDIGESTION & MALABSORPTION

1. Celiac sprue
2. Refractory sprue
3. Whipples disease

4. Short bowel syndrome – Etiology, pathophysiology, complications & management (medical / surgical)
5. Protein losing enteropathy
6. Management under supervision of OP / IP patients including follow up of these patients.
7. Interpret radiological studies and mucosal biopsy

V. GASTROINTESTINAL MALIGNANCY

Training

1. Management under supervision of OP / IP including follow up these patients.
2. Training upper GI and lower GI endoscopy including polypectomy and palliative stenting of obstructed lesions.
3. Interpret radiological studies and mucosal biopsies
4. Study textbooks, journals, seminars, workshops, conferences
5. Lectures from oncology surgeon, medical oncologist, radiation oncologist, medical geneticist and interventional endoscopist.

VI BILIARY TRACT AND PANCREATIC DISEASES

Training methodology

1. Management under supervision of IP / OP patients including follow up of these patients.
2. Interpret radiological studies and mucosal biopsies and FNAC
3. Lectures by interventional endoscopist, interventional radiologist, surgeons.
4. Exposure to microbiology, molecular biology, infectious disease and nutrition

VII GASTROINTESTINAL ENDOSCOPY

1. Esophago-gastro-duodenoscopy – biopsy
2. Therapy of variceal and non variceal upper GI bleed
3. Colonoscopy and polypectomy
4. Esophageal dilatation – wire guided / non wire guided Savary Gillard / CRE / pneumatic dilatation for Achalasia cardia.
5. Diagnostic ERCP

Endoscopy Training:

1) Threshold number of procedures to be performed before competence is assessed
(minimum number of procedures)

1. Esophago-gastroduodenoscopy	150
2. a) Therapy of non variceal haemorrhage (active bleed 10)	25
b) Variceal haemorrhage (active bleed 5)	20
3. Esophageal dilatation	20
4. Flexible sigmoidoscopy	30
5. Colonoscopy	150
6. Snare polypectomy / homeostasis	20
7. Assisting in ERCP Procedure (Side view scopy in ERCP)	25

2) Chronological Exposure:

- Skills to be achieved under supervised training

I year - Upper GI endoscopy / biopsy

- Flexible sigmoidoscopy

- Cognitive understanding as described above

- Know how about the cleaning/Disinfection and drying of the scopes.

- Liver biopsy, large volume paracentesis

II year - Therapy of variceal and non variceal upper GI bleed

- Colonoscopy, polypectomy

- Dilatation of esophageal strictures, pneumatic dilatation for achalasia cardia

- Advanced Gastro endoscopy – 15 days

III year - Knowledge on and observation of the following procedures:

1. ERCP

2. Manometry

3. pH

4. Capsule Endoscopy

5. EUS – Endoscopic Ultrasound

VIII GASTROINTESTINAL AND HEPATIC PATHOLOGY

Training:

1. 7 Days rotation in GI pathology
2. Regular weekly GE-pathology sessions

XI GASTROINTESTINAL RADIOLOGY

Training process:

1. Discussion during ward rounds
2. Exposure at weekly GE-Radiology conferences
3. 15 days rotation in radiology
4. Lectures/self instruction programs – videotapes, video discs.
5. Interventional Gastro Radiology – 15 days.

XII GI SURGERY

Training:

1. Medical – surgical conferences
2. Lecture series
3. 15 days Rotation in GI Surgery

XIII PAEDIATRIC GASTROENTEROLOGY

Training process:

1. Discuss pediatric cases with faculty (paediatric gastroenterologist)
2. Lectures, seminars, journal club

XV WOMENS HEALTH ISSUES IN DIGESTIVE DISEASES

(As part of General Training)

Training:

- (i) Discussion with appropriate faculty (e.g) gynaecologist when treating women with specific problems related to their gender
- (ii) Lectures, seminars

Miscellaneous Training :

1. Candidates are expected to attend regularly the following meetings, Annual conference and mid term conferences of ISG, INASL, SGEI. Annual , Mid term and monthly meetings of ISG Tamil nadu chapter. Guest Lecture Meetings by national and international visiting faculties. CME's , CPC's and other lecture programmes organized by other institutions where facilities are available and make clinical presentations at City Gastro Meet/ Physicians conference etc.
2. Take clinical classes for MD internal Medicine Post Graduates and theory classes for MBBS students, Nursing students and BSc Nutrition students.

6.TEACHING METHODOLOGY:

1. Ward Rounds
2. Patient Care – Wards
3. Bed Side Clinics
4. Case Presentation
5. Topic Discussion (a) Long seminar s (b) short seminars
6. Journal clubs
7. Weekly Tests – Theory – syllabus based model theory exam
8. Attending clinical Meetings – Inter Departmental Meeting
- ISG, INASL, SGE, City Gastro Meet
9. Supervised Basic Endoscopy
10. Supervised Advanced Endoscopy

7. RESEARCH WORK:

1. Basic knowledge of clinical research methods, biostatistics, epidemiology and ethics.
2. Basic knowledge of cell biology, molecular biology, molecular genetics and immunology
3. Critical analysis of current literature, ability to formulate research questions, make a study design, calculate sample size, data management, ways to avoid bias etc.
4. Preparation of proposals for funding and evaluation by institutional review boards
5. Presentation of work in written/oral form at Conferences

6. Help mentors in peer review of articles submitted for publication.

Students should compulsorily attend Research Methodology workshop conducted by the University within first six months of D.M.Course.

8. LOG BOOK:

The Postgraduate student of a Postgraduate Degree Course in Super specialties shall maintain Log Book of the work carried out by them and the training programme undergone during the period of training including details of surgical operations assisted or done independently.

The Log Book shall be checked and assessed by the faculty members imparting the training.

Periodical evaluation of Log Book to be done by the Head of the Department as per 52nd SAB.

The Evaluation of the candidates in both theory and practical aspects will help the candidate in the improvement of his/her knowledge skills & attitude.

9. COMPETENCY ASSESSMENT:

Overall:

1. Communication / Commitment / Contribution / Compassion towards patients and Innovation	-	10 Marks
2. Implementation of Newly learnt techniques	-	10 Marks
3. Documentation of case sheets / discharge Summary / Review	-	10 Marks
4. Number of cases presented in Clinical Meetings/ Journal Clubs / Seminars / Papers presented in Conference.	-	10 Marks
5. No. Of Medals/ Certificates won in the conference / Quiz competitions and other academic meetings with details.	-	10 Marks

	Total	50 Marks

Assessment	I	- February	-	First Year
	II	- August	-	First Year
	III	- February	-	Second Year

IV	- August	-	Second Year
V	- February	-	Third Year
VI	- May	-	Third Year

VIVA INCLUDING COMPETENCY ASSESSMENT – 100 Marks (50+50)

10. THEORY EXAMINATION :

Paper I – Basic Sciences applied to the Speciality

Paper II – General Gastroenterology including Paediatric and Preventive Gastroenterology

Paper III – Hepatobiliary, Pancreatic Diseases

Paper IV – Recent Advances in the Speciality

Each paper will contain:

1. Essay questions (2)	-	2 X 15	=	30 Marks
2. Short Notes (10)	-	10 X 7	=	70 Marks

Total				100 Marks

11. PRACTICAL SCHEME:

Particulars	Time for candidate to examine the cases	Time for examiners to question the candidates	Maximum Marks
Long Case	1 Case x 60 Minutes	60 Minutes	100
Short Case	2 Cases x 15 Minutes	30 Minutes	100
Ward Rounds	3 Patients x 10 Minutes	30 Minutes	100
OSCE	5 Stations x 3 Minutes	15 Minutes	50
Viva Voce		15 Minutes	100 -
Log Book			50
Total			500

As per Medical Council of India Postgraduate Medical Education Regulations, 2000 (Amended upto 10th August 2016), the candidates must submit the following so as to make them eligible to appear for the Examination.

“13.9 A Postgraduate student of a Postgraduate degree Course in broad specialties/ Super Specialties would be required to present one poster presentation to read one paper at a National/State conference and to present one Research paper which should be published/accepted for publication/sent for publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate Degree Examination”.

Apart from Poster/Oral paper presentation in National/State conferences, the Research paper published by the candidate in the University Journal of Medical Sciences will be considered as equivalent to the Research Paper as mentioned in 13.9. clause. Case Reports can also be published in University Journal of Medical Sciences but case reports will not be considered as Research Paper.

The candidate can also present Research Paper as per Clause 13.9 of Post Graduate Education Regulation 2000, and if the article sent for publication by the candidate as primary author or corresponding author which has not yet been published/accepted for publication, the candidate should submit a letter from the HOD, stating that the article sent for publication is of publishable merit and the proof of the Research Article submitted to the Journal for publication should be sent to the university forwarded through the HOD [as per 53rd SAB]

The student can submit articles for the University journal anytime from the time of registration till 6 months prior to theory examination.

12. OSCE: 5 Stations

1. Path slide
2. Clinical situation - interpretation
3. Instrument
4. Imaging
5. Drug – Usage/indications

13. SUGGESTED READINGS:

Books

1. Sleisenger Z. Gastrointestinal & Liver Disease (2 Vol) – Saunders
2. Sleisenger Z. Gastrointestinal & Liver Disease (2 Vol) – Saunders
3. Yamada. Textbook of Gastroenterology (2 Vol)
4. Walker. Paediatric Gastrointestinal Disease (2 Vol) – B.C. Docker
5. A.K. Rustgi – Gastrointestinal Cancer. – Elsevier, Saunders
6. Kelsen. Principles and practice of gastrointestinal oncology – LWW
7. Castell D.O. The esophagus – LWW
8. Schiff. Disease of Liver (2 Vol) – LWW
9. Jaron Rodes. Textbook of Hepatology – Blackwell
10. Sherlock S. Diseases of Liver & Biliary system – Blackwell
11. Suchy. Liver diseases in children – LWW
12. Blumgart. Surgery of liver & biliary tract – Saunders
13. Busutil R.W. Transplantation of Liver (2 Vol) – Elsevier Saunders
14. Gore text book of Gastrointestinal Radiology.
15. Text Book on Endoscopic Ultrasound by Frank Gress & Thomas Savides

****Note:** The editions are as applicable and the latest editions shall be the part of the syllabi.

14. JOURNALS :

GUT

Gastroenterology

Digestive Diseases & Sciences

J Gastroenterology & Hepatology

Hepatology

NEJM

Int. J Gastroenterology

Am. J. Gastroenterology

J. Paed. Gastro & Nutrition

Pancreas

Tropical Gastroenterology

Seminars in Liver Disease

Indian journal of Gastroenterology

Digestive endoscopy

North American clinics in Gastroenterology , Liver and Endoscopy.

DM - MEDICAL ONCOLOGY

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI
Syllabus – D.M - MEDICAL ONCOLOGY

I. AIMS AND OBJECTIVES:

It is a 3-year course that imparts intense training to DM candidates into the field of medical oncology and related subjects with adequate exposure to clinical and laboratory based activities.

II. THEORY SYLLABUS :

1) Basic Scientific Principles:-

As foundations for treating malignant disease, the trainee should understand the biology of cancer, principles of therapy and proper conduct and interpretation of clinical research.

Trainees should know the biology of normal cells and the basic processes of carcinogenesis. They should have an understanding the gene structure, organization, expression and regulation. A fundamental understanding of the cell cycle, its control by oncogenes and its interaction with chemotherapy is important. They should understand tumour cell kinetics, proliferation and programme cell death and the balance between cell death and cell proliferation.

1. Essentials of Molecular Biology – Basic Principles. Genomics and Cancer, signal transduction, Immunology, Cytogenetics, Cell Cycle, Apoptosis, inversion and metastases, angiogenesis and Carcinogenesis, - Genetics, Viral Physics and Chemical.

2. Epidemiology – Epidemiologic methods, Descriptive and Analytical epidemiology.

3. Principles of cancer management: Surgical Oncology, Medical Oncology, Radiation Oncology and Biologic therapy.

4. Cancer Chemotherapy.

5. Pharmacology of Cancer: Biotherapeutics – interferon's interleukins, hormonal therapy, differentiating agents, monoclonal antibodies, antiangiogenic factors.

6. Clinical Trials.

7. Cancer Prevention – tobacco related cancers, diet chemoprevention.

8. Cancer Screening.

9. Cancer Diagnosis – Molecular pathology and Cytology, Imaging, Endoscopy, Laparoscopy.

10. Specialized techniques – minimal access surgery. Vascular access, isolated perfusion, intensity modulated radiation therapy.

11. Systemic Oncology:

i) Head and Neck Cancer.

ii) Lung Cancer.

iii) Mediastinal neoplasms.

iv) Gastrointestinal tract cancer.

v) Cancers of the Genitourinary system.

vi) Gynaecologic cancer.

vii) Breast cancer.

viii) Endocrine Malignancies.

ix) Musculoskeletal tumours.

x) Mesothelioma.

xi) Cancer of the Skin.

xii) Malignant Melanoma.

xiii) Central nervous system – malignancies.

xiv) Paediatric malignancies.

xv) Lymphomas and leukemia.

12. Paraneoplastic syndromes

13. Cancer of the unknown primary site.

14. Peritoneal carcinomatosis.

15. Cancer in immunosuppressed host.

16.Oncologic emergencies – SVC syndrome, spinal cord compression, metabolic emergencies, urologic emergencies.

17.Treatment of metastatic cancer – brain, lung, bone, liver, malignant effusions and ascitis.

18.Haemopoietic therapy- transfusion, growth factors, autologous and allogeneic stem cell transplantation.

19.Infection in the cancer patient.

20.Supportive care and quality of life- pain management, nutritional support, sexual problems, genetic counseling, psychological issues, community resources, care of the terminally ill patient.

21. Adverse effects of treatment- Nausea and vomiting. Oral complications, pulmonary toxicity, cardiac toxicity, hair loss, genital dysfunction, second cancers, miscellaneous toxicity.

22. Rehabilitation of the cancer patient.

23. Oncology nursing including venous access.

24. Ethical issues in oncology.

25. Information systems in Oncology.

26. Alternative methods of cancer treatment.

27. Newer approaches in cancer treatment- Gene therapy, molecular therapy, cancer vaccines, image guided surgery, heavy particles in radiation therapy.

28. Reconstructive surgery.

Bioethics

1. Respect human life and the dignity of every individual.
2. Refrain from supporting or committing crimes against humanity and condemn all such acts.
3. Treat the sick and injured with competence and compassion and without prejudice and apply the knowledge and skills when needed.
4. Protect the privacy and confidentiality of those for whom we care and breach that confidence only when keeping it would seriously threaten their health and

- safety or that of others.
5. Work freely with colleagues to discover, develop, and promote advances in medicine and public health that ameliorate suffering and contribute to human well being.
 6. Educate the public about present and future threats to the health of humanity.
 7. Advocate for social, economic, educational and political changes that ameliorate suffering and contribute to human well being.
 8. Teach and mentor those who follow us, for they are the future of our caring profession.

III. CLINICAL TRAINING:

1. WARD POSTING (IN PATIENT CARE)

Total period – **14 months**

The candidate is posted to work in male ward, female ward and special wards each 3 months in turn. He or she is required to work up patients admitted on those beds and to discuss it with the concerned consultants regarding treatment plan and to present it on the grand rounds and to assume complete responsibility of the patients during their hospital stay. He should work in harmony with the ward nurses. Candidate should learn about administration of chemotherapy and supervision of side effects. Third year post graduates will work in the ward for 2 months in turns (male and female wards) along with 1st year post graduates.

The candidate is posted to Gynaec and Pediatric oncology at Institute of Obstetric and Gynaecology for 3 months to get trained in treatment of Gynaec and pediatric malignancies. (1st year post graduates)

2. OUT PATIENT DEPARTMENT (OPD) POSTING:

Duration is **15 months**.

The candidate should attend to the patient in OPD and plans either admission for chemotherapy/evaluation. They are expected to see new as well as follow-up patients so as to plan out the management and assess the therapeutic responses of a particular patient. The candidates posted to these clinics work under the supervision of consultants.

Also to refer the patient as per the need to other specialty clinics. He also interacts with other specialty departments like gastrointestinal, urology, pain clinic, orthopedics, pediatric surgery, Surgical oncology, Radiation oncology, gynecology oncology, pulmonary medicine. Each candidate is posted for 3 months in turns to administer and monitor day care chemotherapy at OPD.

3. EXTERNAL POSTING :

Duration is **2 months**.

- Molecular oncology and lab training at reputed Institutions for 1 month.
(3rd year post graduates)
- The candidate are expected to learn about various laboratory procedures like cytogenetics, flow cytometry , FISH technique and molecular oncology lab procedures.
- Training and observation in a Haematology unit at reputed Institutions for 1 month.(2nd year post graduates). Candidates get to trained in autologous and allogenic Bone marrow transplant and BMT related issues.

4. PERIPHERAL POSTING :

It will be for **2 months** as follows: (3rd year post graduates)

- ◆ Surgical oncology (2 weeks)
- ◆ Radiation oncology (2 weeks)
- ◆ Pathology(2 weeks)
- ◆ Radiodiagnosis (2 weeks)

During II year, students are encouraged to undergo special postings for learning new advanced techniques / Procedure / Skills in institutions of higher repute where the requisite facilities are available without affecting the duties of the parent department.

IV.SKILL TRAINING:

Candidates posted in wards are expected to do minor procedure and learn skills about

- Bone marrow aspiration & Biopsy

- Liver biopsy
- Core needle biopsy
- Lumbar puncture
- Intrathecal chemotherapy
- Aspiration of pleural , ascitic, and pericardial effusions
- Introducing percutaneous subclavian, internal jugular, and Brachial femoral vein catheters

V.TEACHING METHODOLOGY:

Integrated teaching program to expose the candidate to various fields of oncology are provided by regular clinico-pathologic conferences, seminars, case discussion sessions, and radiology conferences. Following academic activities are planned throughout the year. The candidate will be encouraged to actively participate in these meetings, carefully listen to the topics, ask questions, critically analyze and give his/her comments and suggestions.

PROGRAMME

- **OP case discussion by the Professors and Assistant Professors.**
- **Difficult case discussion and basic science topic presentation by the candidate.**
- **Case Presentation & Discussion by Professor and Assistant Professors.**
- **Tumor board Discussion.**
- **Journal club/Haematology and Pathology slides discussion.**
- **Weekly evaluation with theory tests**
- **Grand Rounds**
- **Symposium – twice a month.**
- **Dept CME(Once in two month) on single subject**
- **CME with other departments(Once a month) like Medical Gastroenterology, Surgical Gastroenterology, Surgical oncology, Radiation oncology etc.**
- **CPC (Clinico-Pathological-Conference)**
(Once a month)

VI.RESEARCH WORK:

The candidate is introduced to the field of research in medical oncology; both at clinical and laboratory level.

The candidate will be trained in the ability to

- Frame a research question.
- Plan a study to answer the question.
- Collect the relevant information and
- Evaluate appropriately the collected data to draw a conclusion.

The candidate should become conversant with the reporting of these results as a research paper, in journals and as a presentation in conferences.

The activities would consist of:

Planning and organizing relevant studies to be submitted as a Research paper at the end of the course.

Students should compulsorily attend the Research Methodology workshop conducted by the University within first six months of D.M Course.

VII. LOG BOOK:

The Postgraduate student of a Postgraduate Degree Course in Super specialties shall maintain Log Book of the work carried out by them and the training programme undergone during the period of training including details of surgical operations assisted or done independently by.

The Log Book shall be checked and assessed by the faculty members imparting the training.

Periodical evaluation of Log Book to be done by the Head of the Department as per 52nd SAB.

The Evaluation of the candidates in both theory and practical aspects will help the candidate in the improvement of his/her knowledge skills & attitude.

VIII. COMPETENCY ASSESSMENT:

Overall:

1. Communication / Commitment / Contribution /

Compassion towards patients and Innovation

-

10 Marks

2. Implementation of Newly learnt techniques	-	10 Marks
3. Documentation of case sheets / discharge Summary / Review	-	10 Marks
4. Number of cases presented in Clinical Meetings/ Journal Clubs / Seminars / Papers presented in Conference.	-	10 Marks
5. No. Of Medals/ Certificates won in the conference / Quiz competitions and other academic meetings with details.	-	10 Marks

Total		50 Marks
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Assessment	I	- February	-	First Year
	II	- August	-	First Year
	III	- February	-	Second Year
	IV	- August	-	Second Year
	V	- February	-	Third Year
	VI	- May	-	Third Year

VIVA INCLUDING COMPETENCY ASSESSMENT – 100 Marks (50+50)

IX.THEORY EXAMINATION:

Paper I - Basic sciences(Radiation Physics Tumour Biology, Biochemistry, Biometry Immunology & Pharmacology)

Paper II - General oncology including Tumor pathology, Radiology & Nuclear Medicine

PaperIII- Medical Oncology including Therapy, Epidemiology and Rehabilitation.

Paper IV - Recent advances in Medical Oncology

1. Essay questions (2) - 2 X 15 = 30 Marks

2. Short Notes (10) - 10 X 7 = 70 Marks

Total -----
100 Marks

X.PRACTICAL SCHEME:

Particulars	Time for candidate to examine the cases	Time for examiners to question the candidates	Maximum Marks
Long Case	1 Case x 60 Minutes	60 Minutes	100
Short Case	2 Cases x 15 Minutes	30 Minutes	100
Ward Rounds	3 Patients x 10 Minutes	30 Minutes	100
OSCE	5 Stations x 3 Minutes	15 Minutes	50
Viva Voce		15 Minutes	100
Log Book			50
Total			500

As per Medical Council of India Post Graduate Medical Education Regulations 2000 (amended upto 10th August 2016) clause **13.9 A Postgraduate student of a Postgraduate degree Course in broad specialties/ Super Specialties would be required to present one poster presentation to read one paper at a National/State conference and to present one Research paper which should be published/accepted for publication/sent for publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate Degree**

Examination.

Apart from Poster/Oral paper presentation in National/State conferences, the Research paper published by the candidate in the University Journal of Medical Sciences will be considered as equivalent to the Research Paper as mentioned in 13.9. clause. Case Reports can also be published in University Journal of Medical Sciences but case reports will not be considered as Research Paper.

The candidate can also present Research Paper as per Clause 13.9 of Post Graduate Education Regulation 2000, and if the article sent for publication by the candidate as primary author or corresponding author which has not yet been published/accepted for publication, the candidate should submit a letter from the HOD, stating that the article sent for publication is of publishable merit and the proof of the Research Article submitted to the Journal for publication should be sent to the university forwarded through the HOD [as per 53rd SAB]

The candidate can submit articles for the University journal anytime from the time of registration in the University till 6 months prior to theory examination.

XI.OSCE: (5 Stations)

1. Clinical Scenario - 4 stations
2. Peripheral blood smear/bone marrow aspiration smear reports
- 3.HPE/IMMUNOPHENOTYPING Report analysis
- 4.Instruments
- 5.Image reporting(radiology)

XII.REFERENCE BOOKS:

- 1 Caner Principles and Practice of Oncology Vincent T. Devita
- 2 Principles and Practice of Pediatric Oncology Philip A. Pizzo
- 3 Decision Making in Oncology Bengamin Djubegovic
- 4 Current Medical Diagnosis and Treatment Lange Medical Book

- International edition
- 5 The Basic Science of Oncology IanF. Tannock
 - 6 Cancer Treatment Charles M Haskel
 - 7 Cancer Chemotherapy Chabner
 - 8 Principles of Internal Medicine Harrison
 - 9 Text Book fo Pediatrics Nelson
 - 10 Text Book of Oncology Abeloff and Armitage
 - 11 Principles and practice of Gynecologic oncology by Barakat.
 - 12 Principles of Radiation Oncology by Bradi and Perez.

****Note:** The editions are as applicable and the latest editions shall be the part of the syllabi.

XIII.JOURNALS :

- 1 Cancer Treatment Review
 - 2 Journals of Pediatric Hematology/Oncology
 - 3 Current Opinion in Oncology
 - 4 The Indian Journal of Cancer
 - 5 The Seminars in Oncology
 - 6 Haematology/Oncology Clinics of North America
 - 7 Medical and Pediatric Clinic of North America
 - 8 Cancer
 - 9 Current Problems in cancer
 - 10 Journal of Clinical Oncology
 - 11 Lancet
 - 12 NEJM (New England Journal of Medicine)
 - 13 Blood
 - 14 British Journal of Hematology
 - 15 Bone Marrow Transplantation
 - 16 Seminars in Hematology
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DM - RHEUMATOLOGY

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI
Syllabus – D.M. RHEUMATOLOGY

1.AIMS & OBJECTIVES:

The syllabus for D.M.Rheumatology Course should comprehensively cover all the aspects in Rheumatology and systemic autoimmunity during 3 years of study period. The student who undergoes the course should have an exposure to all the facets of Rheumatology and related Clinical Immunology, develop adequate knowledge and skill to treat the patients competently after acquiring the degree.

2.THEORY SYLLABUS:

1. Basic science relevant to rheumatological disorders
2. Basic Immunology relevant to rheumatology with special emphasis on autoimmunity
3. Genetics of rheumatic diseases
4. Differential approach to major rheumatic syndrome:
 - o Examination of Joints
 - o Approach to acute and chronic monoarticular arthritis
 - o Approach to acute and chronic oligo articular arthritis
 - o Approach to acute and chronic Polyarthritis
 - o Temporo mandibular joint diseases
 - o Shoulder and neck pain-lowback pain
 - o Foot pain
 - o The fibro - myalgia syndrome
 - o Skin and Rheumatic diseases
 - o Eye and Rheumatic diseases

- o Neurologic manifestations
- o Cardiac manifestations
- o Pulmonary manifestations of connective tissue diseases
- o Arthritis and gastrointestinal and liver diseases
- o Nutrition and rheumatic diseases
- o Psychosocial aspect of rheumatic diseases
- o Kidney and rheumatic diseases.
- 5. Clinical Pharmacology in Rheumatic diseases:
 - o Developing a clinical trial design
 - Major pharmacological actions, interactions, toxicities, indications and other relevant pharmacology of following agents.
 - o Non steroidal anti inflammatory drugs
 - o Antimalarials-gold compounds-D.Penicillamine–methotrexate, sulfasalazine–leflunomide, cyclosporin.
 - o Glucocorticoids-immunoregulatory agents-cytotoxic agents
 - o Therapeutic apheresis
 - o Radiopharmacological agents like Yttrium
 - o Anti lymphocyte antibodies
 - o Anti hyper uricemic drugs
 - o Intravenous immunoglobulin
 - o Autologous stemcell transplantation
 - o Biologicals and biosimilars
 - o Antibiotics in immuno suppressed settings
- 6. Specific articular and connective tissue diseases:

Rheumatoid arthritis-Felty's syndrome–Sjogren's syndrome-spondyloarthropathy-ankylosing spondylitis - Reiter's syndrome,reactive arthritis-HLAB27 related and non-related arthritis- Adult Still's disease. Psoriatic arthritis- enteropathic arthritis- systemic lupus erythematosus-mixed connective tissue disease-overlap syndromes-vasculitic syndrome-vasculitides and related disorders-polyarteritis-vasculitis associated with rheumatic diseases-hypersensitivity-vasculitis-Churg-Strauss Vasculitis-Wegener's Granulomatosis-Takayasu's arteritis, Cogan's syndrome-Kawasaki's disease-giant cell arteritis-polymyalgia rheumatica-Behcet's disease- Scleroderma - localised fibrotic disorders-eosinophilic fascitis-scleroderma-inflammatory disease of muscle-polymyositis-dermatomyositis-gout and related disorders of purine metabolism-diseases associated with deposition of calcium pyrophosphate or hydroxyapatite- osteoarthritis– relapsing polychondritis- amyloidosis sarcoidosis-iron storage disease-multicentric reticulohistiocytosis-Ochronosis-infectious arthritis-bacterial arthritis- mycobacterial and fungal infections-lymes disease-viral arthritis - hemophilic arthropathy-Hemoglobinopathies and arthritis-arthropathies associated with endocrine disorders-hypertrophic osteoarthropathy-neuropathic joint disease musculoskeletal syndrome associated with malignancy-heritable disorders of structural proteins-metabolic bone disease-osteoporosis osteonecrosis osteomalacia involving joints-rheumatic fever-childhood S.L.E. and dermatomyositis-Scleroderma,vasculitis,antiphospholipid antibody syndrome,soft tissue rheumatism – rheumatic, complications of drugs - ANCA related vasculitis – panniculitis – hyperlipidemias - tumours and tumor like lesions involving joints- hyper mobility syndromes, reflex sympathetic dystrophy-familial mediterranean fever and all auto inflammatory syndromes,primary immuno deficiencies, Paget's disease, rheumatic manifestations of systemic diseases.

Medical orthopaedics and rehabilitation:-

Sports Medicine – entrapment neuropathies - chronic pain syndromes and management – Physiotherapy – occupational therapy - health outcome assessment-rehabilitation of patients with rheumatic diseases

7. Reconstructive surgery in Rheumatic Diseases:

Principles of reconstructive surgery–pre-operative evaluation–choice of procedure–post operative management and followup – surgery in children.

8. Disease Activity scoring and outcome measures

9. Critical appraisal of rheumatic disease literature

10. Basic epidemiological and statistical principles relevant to rheumatology.

11. Recent advances in rheumatology – may refer ‘current opinion in rheumatology’ and nature review rheumatology’ for reviews , apart from top rheumatology journals.

12. Techniques in Rheumatology: like polarizing microscopy, Immunofluorescence microscopy, PCR, Flowcytometry, ELISA, Arthroscopy, Intra-articular injections, ultrasonography, MRI, Nailfold Video capillaroscopy, Bone densitometry.

Bioethics:

1. Respect human life and the dignity of every individual.
2. Refrain from supporting or committing crimes against humanity and condemn all such acts.
3. Treat the sick and injured with competence and compassion and without prejudice and apply the knowledge and skills when needed.
4. Protect the privacy and confidentiality of those for whom we care and breach that confidence only when keeping it would seriously threaten their health and safety or that of others.

5. Work freely with colleagues to discover, develop, and promote advances in medicine and public health that ameliorate suffering and contribute to human well being.
6. Educate the public about present and future threats to the health of humanity.
7. Advocate for social, economic, educational and political changes that ameliorate suffering and contribute to human well being.
8. Teach and mentor those who follow us, for they are the future of our caring profession.

3. CLINICAL TRAINING:

The Students will be clinically trained in parent department during the 3 years course.

The schedule of Posting and training programme for three years period of study:

Year wise training programme for D.M.Rheumatology.

First year:

Rheumatology department

(Out patient/Wards/Laboratory)

One Year

Second Year:

Special Postings

Nephrology (HPE, Dialysis, Transplantation, Plasmapheresis)	One Week
Dermatology	One Week
Orthopaedics (Surgeries, Prosthesis, pre and post operative care)	One Week
Ophthalmology	One Week
Radiology	Four Week
Physical Medicine & Rehabilitation	One Week
Molecular and Immunology laboratory of Adyar Cancer Institute, Adyar or National Institute of Immunology, New Delhi	Three weeks

Students who are posted in another department in the same institute should attend Theory classes, Journal club and case presentation daily at the Department of Rheumatology (timings to be adjusted with the departments of peripheral postings).

Rheumatology Department:

OP/Wards/Laboratory

Nine Months*

Ultrasonography (minimum of 10 scans in each joint) To be trained and supervised by a Radiologist / trained Rheumatologist with expertise in ultrasound	2 months*
Laboratory	2 months*
These 4 months* postings as above are Included in the Nine Months ie. in adjustment with parent department and the department/unit posted to . Minimum disruption to parent department's work should be ensured.	

During II year, students are encouraged to undergo special postings for learning new advanced techniques / Procedure / Skills in institutions of higher repute where the requisite facilities are available without affecting the duties of the parent department.

Third Year:

Rheumatology Department-

OP/Wards/Laboratory

one year*

Laboratory Posting – 2months* included within the one year period as above*

4. SKILL TRAINING REQUIREMENTS:

Diagnostic Procedures:

Specific clinical techniques and imaging:

- Synovial fluid aspiration, analysis and microscopy
- Aspiration and injection of joints and soft tissue
- Synovial biopsy

- Imaging of joints- Ultrasonogram of joints and soft tissues,
- MRI, x-rays
- Nail fold video capillaroscopy (Principles)
- DEXA scan (principles, interpretations and applications)
- Contrast radiography of joints and bones: C.T, MRI, DSA, MR and CT angiography, P E T CT in Rheumatology. (principles, interpretations and applications)
- EMG, NCS

Specific lab tests:

- Rheumatoid factor-ELISA, Nephelometry
- Antinuclear antibodies by Indirect
- Immunofluorescence
- Antiphospholipid antibodies by ELISA
- Antibodies to ENA by ELISA
- Lupus anticoagulant by DRVVT
- ANCA by IIF and ELISA
- Acute phase reactants – ESR, CRP
- HLA Typing by PCR

Specific lab techniques:

- Immuno Fluorescence
- ELISA
- Immuno blotting
- Electrophoresis
- S.D.SPAGE
- Crystal Identification in Synovial fluid by polarizing microscopy
- Single Radial Immuno Diffusion
- Polymerase Chain Reaction(PCR)
- Biological markers of rheumatic diseases

5. TEACHING METHODOLOGY:

- Ward / OPD patient management.
- Ward rounds, case presentations and discussions
- Problem solving sessions – along with ward rounds.
- Bed side teaching 3 days a week by consultants
- Grand round case conference once a week
- Discussion of Interdepartmental Consults / Referral to consultants
- Faculty Lecture – Once a Week.

- Assisting / performing procedures.
- Update review / Seminar on one clinical and one basic topics
- once a week short topic presentations on clinical exam oriented topics.
- Clinicoradiological and Clinicpathological conferences once a fortnight at least.
- Journal club: Basic Sciences and Clinical papers once a week plus a whole journal review (once a week for each of these in a session)
- Inter-departmental Periodical meeting on relevant topics with all interface / related departments including basic science Departments.
- Research review- update and progress of research projects of students and faculty- at least once a month.
- Guest and in-house lectures. Conferences, seminars and CME's – periodically by external and internal speakers
- Morbidity/mortality auditing sessions with literature review
- Participation in workshops (national and international)
- Teaching undergraduates / postgraduates / paramedical staff
- Biomedical equipments use and maintenance.

Candidates should be marked by all teachers in all sessions and the average should be intimated as feedback to candidate in sealed envelope every 3 months and Specific mentoring should be done by teachers to improve any shortfalls. Similarly, candidates also can give feedbacks to teachers about the shortcomings in teachings without any names mentioned in sealed envelope to the HODs..

6.RESEARCH WORK:

GCP training and undergo a research methodology training and ethics Basic Biostatistics and epidemiology sessions within the institute should be trained in scientific communications.

Should undertake at least one clinical and one basic research project under the guidance of Departmental Faculty.

The candidate will be trained in the ability to

- Frame a research question.
- Plan a study to answer the question.
- Collect the relevant information and
- Evaluate appropriately the collected data to draw a conclusion.
- Should be able analyse data and interpret
- Attend manuscript writing workshop

- Should learn how to do clinical trials.
- The candidate should become conversant with the reporting of these results as a research paper, in journals and as a presentation in conferences.

Students should compulsorily attend Research Methodology workshop conducted by the University within first Six months of D.M. Course.

7. LOG BOOK:

The Postgraduate student of a Postgraduate Degree Course in Super specialties shall maintain Log Book of the work carried out by them and the training programme undergone during the period of training including details of surgical operations assisted or done independently.

The Log Book shall be checked and assessed by the faculty members imparting the training .

Periodical evaluation of Log Book to be done by the Head of the Department.

The Evaluation of the candidates in both theory and practical aspects will help the candidate in the improvement of his/her knowledge skills & attitude.

8. COMPETENCY ASSESSMENT:

Overall:

1. Communication / Commitment / Contribution /		
Compassion towards patients and Innovation	-	10 Marks
2. Implementation of Newly learnt techniques	-	10 Marks
3. Documentation of case sheets / discharge		
Summary / Review	-	10 Marks
4. Number of cases presented in Clinical Meetings/		
Journal Clubs / Seminars / Papers presented in		
Conference.	-	10 Marks

5. No. Of Medals/ Certificates won in the conference
/ Quiz competitions and other academic meetings
with details.

- 10 Marks

Total 50 Marks

Assessment	I	- February	-	First Year
	II	- August	-	First Year
	III	- February	-	Second Year
	IV	- August	-	Second Year
	V	- February	-	Third Year
	VI	- May	-	Third Year

VIVA INCLUDING COMPETENCY ASSESSMENT – 100 Marks (50+50)

9. THEORY EXAMINATION:

Paper – I Basic Sciences & Diagnostic Procedures in Rheumatology and Clinical Immunology

Paper -II Clinical Rheumatology and Clinical Immunology

Paper-III Clinical Pharmacology, Rehabilitation Surgery, Special Problems related to Rheumatic Diseases, Paediatric Rheumatology, Pregnancy and Rheumatic diseases.

Paper – IV Recent Advances in Rheumatology and Immunology

Each paper will contain:

1. Essay questions (2) - 2 X 15 = 30 Marks

2. Short Notes (10) - 10 X 7 = 70 Marks

Total 100 Marks

1 0. CLINICAL EXAMINATION:

Particulars	Time for candidate to examine the cases	Time for examiners to question the candidates	Maximum Marks
Long Case	1 Case X 60 minutes	60 Minutes	100
Short Case	2 Cases X 15 Minutes	30 Minutes	100
Ward Rounds	5 Cases x 6 Minutes (10 Marks each)	30 Minutes	50
Practical	5 Stations x 6 Minutes (20 Marks each)	30 Minutes	100
Viva Voce		15 Minutes	100
Log Book			50
TOTAL			500

Cases should include at least –

- One arthritic condition like RA/Psoriatic/other arthritis
- One spine disease.
- One connective tissue disease of Lupus/scleroderma/myositis/overlap spectrum
- One vasculitic condition
- One pediatric rheumatology case

VIVA VOCE

1. HPE
2. Radiology
3. Rheumatology topics not covered under theory / practicals, problem based discussion
4. Research Project.

As per Medical Council of India Post Graduate Medical Education Regulations 2000 (amended upto 10th August 2016) clause 13.9 A Postgraduate student of a Postgraduate degree Course in broad specialties/ Super Specialties would be required to present one poster presentation to read one paper at a National/State conference and to present one Research paper which should be published/accepted for publication/sent for publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate Degree Examination.

Apart from Poster/Oral paper presentation in National/State conferences, the Research paper published by the candidate in the University Journal of Medical Sciences will be considered as equivalent to the Research Paper as mentioned in 13.9. clause. Case Reports can also be published in University Journal of Medical Sciences but case reports will not be considered as Research Paper.

The candidate can also present Research Paper as per Clause 13.9 of Post Graduate Education Regulation 2000, and if the article sent for publication by the candidate as primary author or corresponding author which has not yet been published/accepted for publication, the candidate should submit a letter from the HOD, stating that the article sent for publication is of publishable merit and the proof of the Research Article submitted to the Journal for publication should be sent to the university forwarded through the HOD [as per 53rd SAB]

The student can submit articles for the University journal anytime from the time of registration till 6 months prior to theory examination.

11.Practicals:(Questions should focus on principles, interpretation, troubleshooting and utility rather than too much details of the procedure itself):

1. ANA by Indirect Immunofluorescence
2. ELISA for autoantibodies especially DsDNA, ENAs, PR3, MPO
3. NEPHELOMETER – RF, CRP, C3, C4
4. HLA by PCR
5. IMMUNOBLOT
6. Flow cytometry
7. Polarising microscopy

12. REFERENCE BOOKS:

Kelley's Textbook Of Rheumatology
Hochberg's Textbook Of Rheumatology
Oxford Textbook Of Rheumatology
Cassidy's Paediatric Rheumatology
Dubois SLE
Kuby - Immunology

****Note:** The editions are as applicable and the latest editions shall be the part of the syllabi.

13. JOURNALS:

Rheumatic Clinics of North America
Current Opinion in Rheumatology
Nature Reviews Rheumatology
Lupus
International Journal of Rheumatic diseases
Oxford Rheumatology
Indian JournalOf Rheumatology
Arthritis & Rheumatology
Annals of Rheumatic Diseases
Cell
Journal of Immunology

D.M. - CLINICAL HAEMATOLOGY

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY, CHENNAI
Syllabus - D.M Clinical Hematology

AIM:

The syllabus for DM,(Clinical Hematology) course should comprehensively cover all the aspects of laboratory and clinical Hematology including stem cell transplantation during the three years of study period. The student who undergoes the course should have exposure to all aspects of hematology and develop adequate knowledge and skill to treat the patients with hematological disorders independently and competently after acquiring the degree.

OBJECTIVE:

India must produce specialists in Hematology who are able to integrate the laboratory aspects and clinical management of the patient with hematologic disorders. There have been numerous advances in Hematology over the past two decades which makes it necessary for the country to have post-graduate training in the specialty. The Hematology laboratory is now expected to provide rapid, accurate and reproducible results for large numbers of samples and this is possible with automation. Molecular techniques are now no longer research tools but necessary for ante natal diagnosis and clinical decision making. Blood banking has come a long way with component therapy and single donor apheresis. Bone Marrow transplantation now provides a cure for many hitherto incurable diseases and a competent hematologist is necessary to offer this type of treatment. The doctor who undergoes post-graduate training in hematology should possess the necessary clinical and laboratory skills to be able to manage patients with primary hematological problems and interact as a consultant for hematology problems from other specialties and be competent in laboratory hematology and transfusion medicine.

THEORY SYLLABUS:

Departments involved in the training program:

- i) Clinical Hematology
- ii) Immuno Hematology and Transfusion Medicine
- iii) Biochemistry
- iv) General Pathology
- v) Nuclear Medicine
- vi) Radiotherapy

I. Laboratory Hematology:

A. General Laboratory Hematology:

- a) Proper use and care of common laboratory instruments such as the light microscope, Centrifuge, water baths, freezers, weighing balance etc.,
- b) Weighing of solids, preparation of molar and Normal solutions, preparation and use of buffers. Familiarization with the practical concepts of pH, molarity, normality, osmolality, normal values and reference ranges.
- c) The nature and uses of distilled and deionized water.
- d) Blood collection of samples venupuncture and finger prick methods of sample collection, types of anticoagulants, containers and the effects of delay in processing and storage.
- e) Determination of blood counts (Hemoglobin, hematocrit, total WBC and platelets) manually and calculation of red cell indices.
- i) Use of automated electronic blood cell counters including principles and practice.
- ii) Interpretation of peripheral blood counts.
- iii) Preparation of blood films - manual and automated techniques.
- iv) Staining of peripheral blood films with Romanowsky and other dyes by manual and automated techniques.
- v) Review of normal and abnormal blood films with emphasis on
 - a) Morphology of red cells, White cells and Platelets.
 - b) Performance of WBC differential count.
 - c) Subjective assessment of platelet count.
 - d) Diagnostic interpretation of abnormal films.
- vi) Preparation of smears of bone marrow aspirates and biopsy imprints (touch preparations).
- vii) Preparation and staining of thin and thick blood films for malaria parasites.

viii) Supravital staining of reticulocytes; manual and automated counting of reticulocytes.

ix) Performance of bone marrow aspiration and trephine needle biopsy.

xi) Staining (Romanowsky dyes and Prussian Blue for iron) and diagnostic valuation of smears of bone marrow aspirate.

xii) Performance and interpretation of HbS (sickle hemoglobin) solubility test, screening for red cell G6PD activity and its interpretation.

xiii) Neutrophil function assays.

B. Cyto Chemistry:

Performance of the following staining procedures viz. Kleihauer acid elution technique for HbF: PAS: Sudan Black B, Myeloperoxidase, specific and non-specific and dual esterases, acid phosphatase and iron staining.

C. Laboratory Investigation of Hemolytic Anemias with particular reference to the Hemoglobinopathies (including the thalassemias) red cell Enzymopathies.

(A) Red cell membrane disorders and Immune Hemolytic anemias:

i) HbS solubility test.

ii) Screening for unstable hemoglobin (heat instability and Isopropanol tests).

iii) Supravital staining for HbH inclusions.

iv) Principles and practice of separation and identification of normal and abnormal hemoglobin by electrophoresis and chromatography.

v) Quantitation of normal HbA, HbF and HbA₂ and abnormal HbS, D,E,C etc. by densitometry and chromatography – HPLC.

vi) Quantitation of HbF by alkali destruction and Cellular distribution of HbF by the Kleihauer elution technique.

vii) Heinz body preparation.

viii) Screening for red cell G6PD deficiency and quantitative estimation of red cell G6PD activity.

ix) Screening for red cell pyruvate kinase (PK) Deficiency and assay of red cell pyruvate kinase activity.

x) Screening for other red cell enzymopathies.

xi) Standard hypotonic saline osmotic fragility test, acid Glycerol lysis, time (AGLT) and autohemolysis tests.

xii) Sucrose lysis and Ham's acidified serum tests for PNH, Urine hemosiderin.

xiii) Direct and indirect antiglobulin (Coombs) tests, warm and cold autoantibody (Cold agglutinin) titre, Donath Land-steiner, cold auto antibody screening and titration.

B) Miscellaneous bio chemical tests on red cells, Plasma and Urine:

i) Principles of procedures for estimation of plasma bilirubin and hemoglobin and significance of results, screening for methaemalbumin, methaemoglobin and Sulphaemoglobin.

ii) Screening for cryoglobulins and cryofibrinogen; principles of immunoglobulin estimation and immuno electrophoresis.

iii) Examination of urine for Hb, red cells, hemosiderin, urobilinogen and bilirubin.

iv) Principles of estimation and significance of serum ferritin, Iron and TIBC.

v) Principles of estimation and significance of red cell folate, Serum folate and serum cobalamin.

C) Cytogenetics:

Familiarization with cytogenetic techniques, understanding the principles of cytogenetics and appreciate the relevance and significance of chromosomal studies in diagnostic hematology, interpreting the results of chromosome preparation of hematopoietic cells.

D) Laboratory Investigation of Bleeding Disorders:

a) Platelets

- i) Performance of Ivy bleeding time, template bleeding time and platelet count; study of platelet morphology.
- ii) Principles, practice and interpretation of platelet aggregometry tests.
- iii) Platelet associated immunoglobulin (PIA Ig) and circulating antiplatelet antibodies.
- b) Screening and coagulation factor abnormalities:
 - i) Prothrombin time and Stypven time.
 - ii) Activated partial thromboplastin time.
 - iii) Thrombin time and reptilase time.
 - iv) Plasma fibrinogen.
 - v) Correction studies with normal plasma, adsorbed plasma, aged serum and factor deficient plasmas.
 - vi) FDP and D- Dimers.
 - vii) Assays of clotting factors particularly factors viii and ix.
 - viii) Urea solubility test for factor XIII.
- c) Euglobulin lysis time and other relevant tests of plasma, fibrinolytic activity.

E) Laboratory Investigation of Thrombotic disorders:

- i) Assays of plasma AT III, protein C, protein S.
- ii) Screening for lupus anticoagulant and activated protein C resistance ; Principles of screening tests and interpretation of results.
- iii) Laboratory monitoring of anticoagulant (heparin and oral anti-coagulant) therapy.
- iv) Techniques for the detection of anticardiolipin antibodies;

F) Transfusion Medicine:

1. a) ABO blood grouping (forward and reverse), Rh typing (Phenotypes and genotypes), screening of antibody in sera of donors and recipients, antibody identification following elution by various techniques.

b) Blood group compatibility (cross matching testing).

c) Investigation of ABO, Rh and other immunohemolytic diseases of the new born.

d) Investigations of platelet refractoriness.

e) Practical aspects in the selection of blood for normal exchange transfusion.

2. Donor recruitment.

3. Clinical evaluation and laboratory screening of donors prior to phlebotomy.

4. Phlebotomy of donors.

5. Blood component preparation and storage.

6. Practical and administrative procedures involved in issuing and transfusing blood.

7. Principles of the mechanics of the cell separator and its use for blood component preparation and therapeutic apheresis.

8. Practical steps in the laboratory investigation of transfusion reactions.

G. Flow Cytometry:

A working knowledge of the principles and practice of flow cytometry, sample preparation and interpretation of the clinical significance of common leucocyte immunophenotypes; its use and relevance in the evaluation of red cell and platelet disorders.

H) Laboratory Equipment:

A working knowledge of the mechanics of the various laboratory instruments including their operation, calibration and basic maintenance is desirable.

I. Laboratory Organizations:

- a) Laboratory space distribution, ordering, location and installation of laboratory equipment; work flow procedures and handling of samples.
- b) Staffing - technical and non-technical.
- c) Use of computers and generation of laboratory statistics.
- d) Health and safety measures - personnel safety.
- e) Waste disposal.
- f) Quality assurance (Internal and External) measures.
- i) Pre-analytical variables : request forms, patient information, patient preparation, effects of medication and blood transfusion, sample collection, anticoagulants, containers, sample labeling, identification, transport, processing and storage.
- ii) Analytical variables inter laboratory harmonization, data handling and statistical analysis.
- iii) Post analytical variables : computer inter facing security and recording of results, turn around time.

II. Histopathology module:

Practical laboratory training and related theory should cover the following areas:

- a) General processing of tissues.
- b) Techniques of cytology including cytopsin in relation to body fluid of patients with hematological disorders.
- c) Immunocytochemistry relevant to hematology.
- d) Electron microscopy of hemopoietic cells.
- e) Anatomical pathology of the bone marrow - review of biopsy material.

III. Bio-chemistry Module:

Laboratory Techniques - Practical hands on experience and related theoretical background in the following:

- a) Separative procedures - Electrophoretic techniques, chromatography.
- b) Immunochemical methods.
- c) Radio Immunoassays.

IV. HLA module for hematologists:

Demonstration and understanding the principles of:

- a) Separation of lymphocytes using density gradient centrifugation.
- b) The microlymphocytotoxicity test and its application in HLA typing, cross matching and antibody screening.
- c) DNA based HLA typing.
- d) HLA antibody identification.
- e) Miscellaneous investigations (on request) including mitogen and antigen induced lymphocyte transformation.

V. Molecular Biology :

Understanding the principles involved in the molecular diagnosis of Hematological disorders:

- a) DNA and RNA extraction.
- b) PCR - Polymerase Chain Reaction.
- c) RT and RQ PCR.
- d) RFLP and other techniques to evaluate polymorphisms.
- e) Mutation detection principles and techniques.
- f) Sequencing.

VI. Nuclear Medicine:

- a) Measurement of blood volume, red cell mass, red cell survival studies.
- b) Screening techniques applicable to blood disorders.
- c) Use of PET and gallium scans.

VII. Medical Statistics:

- a) Study design, statistical methods, survival curves, data collection and storage, interpretation and analysis.

II. Clinical Hematology Training:

With appropriate guidance and under supervision, the post-graduate student will be responsible primarily for the acquisition of knowledge in all areas of Hematology and Transfusion Medicine. Such knowledge will be acquired and demonstrated through Seminars, case presentations, Journal clubs, Tutorials, proper use of the library for Suggested Reading' and formal reviews of selected major topics. Faculty should be present at these various exercises so as to provide the appropriate input. When necessary, faculty may be required to review certain subjects in the form of formal lectures, however lectures will not play a dominant role in the theoretical component of the training Program. Clinical experience will be acquired by the trainee by day to day management of all patients admitted to the hematology service. Faculty will be involved in teaching of trainees in the ward rounds and out-patient clinics.

Red Cell Disorders:

Clinical evaluation of a patient with anemia, history, physical examination, appropriate laboratory investigations and management, Comparative epidemiological significance of 'nutritional' and other anemia's in the population and the national program for control.

1. Iron deficiency anemia:

Epidemiology, iron deficiency as a community health program, causes in the population, control strategies in the population. Evaluation of the individual patient interpretation of serum iron, TIBC, transferrin, ferritin, indications for and interpretation of ferrokinetic studies, management including iron replacement.

2. Megaloblastic anaemia:

Clinical and laboratory evaluation, clinical recognition, evaluation and management of complications of vitamin B12 deficiency, investigation of etiology and management.

Understanding the role of Vitamin B12 and folate in cellular metabolism and the interaction of disease and drugs with the metabolism of folate.

3. Hemolytic anemia:

Evaluation of a patient with hemolysis and investigation of its courses;

i) Thalassemia: Principles of control of the thalassemia syndromes in the population, screening strategies, antenatal diagnosis, genetic counselling, clinical and laboratory diagnosis of alpha and beta thalassemia syndromes. Management of thalassemia intermedia and major transfusion regimes, chelation, role of splenectomy and bone marrow transplantation.

ii) Sickle cell disease: Evaluation management of the steady state, management of painful of crises, management of chronic complications, clinical and hematological features of the various sickle cell diseases, clinical and hematological effects of the interaction of thalassemia with sickle cell anemia; therapeutic role of bone marrow transplantation.

iii) Inherited enzymopathies (Red Cell G6PD deficiency) evaluation and management of acute hemolytic crises.

iv) Acquired hemolytic disorders, immune hemolytic anemia management with immunosuppression, role of intravenous immunoglobulin, plasmapheresis, splenectomy, Clinical and laboratory evaluation (including etiological diagnosis) of patients suffering from acquired intravascular hemolysis.

4. Aplastic anemia:

Etiology, evaluation and management including immunosuppression (antilymphocyte globulin etc) and supportive therapy. Role of bone marrow transplantation in treatment of the individual patient; preparation for bone marrow transplantation.

5. Red Cell Aplasia:

Diagnostic evaluation and treatment of congenital and acquired forms. Transient erythroid aplasia including the pathogenetic role and biology of the human B19 parvovirus.

III. White Cell Disorders :

1) Neutropenia : Clinical evaluation of neutropenic patient, role of surveillance microbiology, antimicrobial therapy in neutropenia, role of growth factors, principles in providing a sterile environment for the neutropenic patient.

2) Functional disorders of neutrophils: Neutrophil function, laboratory tests for evaluation and management of patient with chronic neutrophil dysfunction, role of growth factors and bone marrow transplantation.

3) Leukemia: Clinical evaluation, diagnostic confirmation by morphology, immunophenotyping, special stains, cytogenetics and electronmicroscopy. The trainee must be familiar with the principles of leukemia management and the various protocols available. He/she should be familiar with the statistical tools used to evaluate therapy protocols, survival curves etc. He/she should be thoroughly familiar also with the pharmacology of antimitotic drugs and their toxicity and very well versed in the supportive and management of patients with all types of leukaemia.

4) Myeloproliferative neoplasms (MPN):

Classification, systematic diagnostic evaluation of erythrocytosis including polycythemia vera, interpretation of blood volume studies with radionucleotides, familiarity with current management strategies of MPD including the use of interferons.

5) Lymphoma: Classification of lymphomas - principles in staging, Management of the different types of lymphomas.

6) Immuno deficiency disorders: Trainees must be able to order systematically the appropriate investigative scheme for a patient with congenital or acquired immuno-deficiency, they must understand the principles of management with immunoglobulin replacement, interferons, bone marrow transplantation and be familiar with the hematological manifestations (and their therapy) of AIDS.

7) Multiple Myeloma and other paraproteinaemia: Clinical and laboratory evaluation of a patient with a monoclonal gammopathy. Interpretation of quantitative immuno-globulin levels, serum protein electrophoretic strips and immunoelectrophoresis patterns, concept of monoclonal gammopathy of undetermined significance, management of myeloma and Waldenstrom's macroglobulinaemia.

IV) HEMOSTASIS - (Trainees should be thoroughly grounded in the general clinical (history and physical signs) approach to the patient with a bleeding tendency.

1. Thrombocytopenia:

Thorough understanding of platelet kinetics and evaluation with radionucleotides. Evaluation and investigation of the aetiology of thrombocytopenia. The student should be conversant with the spectrum of management including immunosuppression, intravenous immunoglobulin.

2. Inherited platelet function disorders:

Clinical evaluation, laboratory diagnostic strategies and management.

3. Inherited coagulation factor deficiencies:

Laboratory diagnosis of hemophilia, genetics and antenatal diagnosis, principles of factor replacement factor replacement schedule in a patient with hemophilia who needs surgery, management of complications. Principles of management of patients with inhibitors.

4. Acquired bleeding disorders:

Vitamin K deficiency and supplementation; DIC its course and management, management of hemorrhagic complications of liver disease and renal failure.

5. Thrombotic disorders:

Classification and laboratory diagnosis of inherited thrombotic disorders, evaluation of hemostasis in the acquired thrombotic disorders, clinical use and monitoring of anticoagulants.

V. Transfusion Medicine:

1. Blood component preparation and clinical use:

Collection of blood, correct techniques for venupuncture, plastic systems, anticoagulants and additives and their effect on storage stability, centrifugation, preparation of platelets fresh frozen plasma and cryoprecipitate, storage of components, principles of fractionation. Quality assurance in transfusion medicine. A thorough understanding of the clinical indications for the proper use of specific blood components.

2. Diagnosis and management of transfusion - related complications:

Febrile transfusion reactions - laboratory investigations, diagnosis, management of prevention diagnosis and management of hemolytic transfusion reactions. Infections transmitted by transfusion complications of transfusion.

3. Cell Separation principles:

The trainee must be able to perform cell separation and plasmapheresis. Principles of the plasmapheresis. Principles of the machine, continuous versus intermittent flow techniques, replacement fluids for plasmapheresis, current status and indication in various diseases should also be known and understood.

4. Techniques of leucodepletion:

Problems related to white cells in donor and techniques of removal. Principles of filter design and use.

5. Irradiation of blood components:

Biology of irradiation of blood and components; transfusion graft versus host disease (GVHD) indications for irradiation of blood. Use of equipment.

6. Management of alloimmunisation in relation to transfusion :

Techniques for prevention of alloimmunisation; role of ultra violet radiation and photosensitizers, management of patients with red cell and platelet allo antibodies.

VI. Bone Marrow Transplantation:

1) Current Indications: The student should be familiar with the current indications and results of bone marrow transplantation in various diseases.

2) Donor Selection: HLA typing issues in stem cell transplantation. Issues related to matched unrelated donor, cord blood transplants and haplo-identical stem cell transplants.

3) Conditioning regimens: The trainees must be familiar with the different conditioning regimes, principles of their use in different disorders and complications.

4) Harvesting and manipulation of bone marrow: Bone marrow collection, red cell, or plasma reduction, peripheral blood stem cell mobilization, collection and cryopreservation. Transfusion of marrow, purging of marrow - T cell depletion.

5) Transplantation immunology: Histocompatibility, graft versus host disease – diagnosis and management, Immune reconstitution following transplantation.

6) Management of the post-transplant patient.

VI) Hematological Oncology:

1) Cell Cycle - Cell Kinetics

2) Principles of Chemotherapy

3) Oncogenesis

4) Cytogenetics in relation to hematological malignancy

5) Use of growth factors

VII) Consultation Hematology:

1) Hematological complications of pregnancy and the interactions of the pregnant state with disorders of the Hemopoietic system.

2) Hematological complications of systemic disease.

3) Hematological problems of the intensive care patient.

VIII) Neonatal Hematology:

The candidate should be familiar with hematological problems in the new born and should be able to interact with the neonatologist regarding management.

Bioethics

1. Respect human life and the dignity of every individual
2. Refrain from supporting or committing crimes against humanity and condemn all such acts
3. Treat the sick and injured with competence and compassion and without prejudice and apply the knowledge and skills when needed.
4. Protect the privacy and confidentiality of those for whom we care and breach that confidence only when keeping it would seriously threaten their

health and safety or that of others.

5. Work freely with colleagues to discover, develop, and promote advances in medicine and public health that ameliorate suffering and contribute to human well being
6. Educate the public about present and future threats to the health of humanity
7. Advocate for social, economic, educational and political changes that ameliorate suffering and contribute to human well being.
8. Teach and mentor those who follow us, for they are the future of our caring profession.

CLINICAL AND LABORATORY TRAINING:

The students will be clinically trained in parent department during the 3 years course.

Clinical ward training period - 18 months.

Transfusion Medicine and Immunohematology laboratory posting - 6 months (including Blood Bank and HLA laboratory)

Posting in bone marrow transplant unit - 3 months

Long term follow up clinics / outpatient Clinics - 6 months

Peripheral postings (Radiation therapy unit / Biochemistry

Nuclear Medicine / Molecular laboratory / Radiology / Pathology) - 2 months

Exchange visit with another tertiary center in the country - 1 month .

During II year, students are encouraged to undergo special postings for learning new advanced techniques / Procedure / Skills in institutions of higher repute where the requisite facilities are available without affecting the duties of the parent department.

SKILL TRAINING:

The student must have acquired certain surgical skills in a structured manner during the three year period of his course. These skills will be achieved by either assisting at the surgery or performing the surgery under the supervision of the teacher.

I year

Should have assisted in following procedures	Should have performed the following procedures
Bone marrow harvest Peripheral blood stem cell collection on apheresis machine Preparing chemotherapy schedules and bone marrow transplant protocols Hickman catheter insertion	Bone marrow aspiration and trephine Lumbar puncture Central line insertion

II year

Should have assisted at the following procedures	Should have performed the following procedures
Stem cell enumeration Stem cell cryopreservation Regular apheresis – platelet and stem cell collection	Additional central line insertions Bone marrow aspirations Lumbar punctures Operate flowcytometer Operate automated cell counters Perform routine coagulation assays Confidently report peripheral blood and bone smears Complete coagulation work up perform and prepare report Do all the tests that comprise a complete hemolytic work up

III year

Should have assisted at the following Procedures	Should have performed the following procedures
As in second year	Continue to do all that was done in the previous two years and to increase speed and skill

TEACHING METHODOLOGY

1. Teaching session with Faculty – once in a week
2. OP clinics – 4 days/week
3. Ward rounds - 5 days/week
4. BMT clinic - 2 days/week
5. Journal club - 1 day/week
6. Seminar – once in a week
7. Laboratory teaching session – once in a week
8. Case audits and discussion – once in a week
9. Symposium – once in a month
10. Guest lecture – once in 6 months

RESEARCH WORK

The candidate is introduced to the field of research in medical oncology; both at clinical and laboratory level.

The candidate will be trained in the ability to

- Frame a research question.
- Plan a study to answer the question.
- Collect the relevant information and
- Evaluate appropriately the collected data to draw a conclusion.

The candidate should become conversant with the reporting of these results as a research paper, in journals and as a presentation in conferences.

The activities would consist of:

Planning and organizing relevant studies to be submitted as a Research paper at the end of the course.

Students should compulsorily attend Research Methodology workshop conducted by the University within first six months of D.M.Course.

LOG BOOK:

The Postgraduate student of a Postgraduate Degree Course in Super specialties shall maintain Log Book of the work carried out by them and the training program undergone during the period of training including details of procedures assisted or done independently by.

The Log Book shall be checked and assessed by the faculty members imparting the training on a monthly basis.

Periodical evaluation of Log Book to be done by the Head of the Department as per 52nd SAB.

The Evaluation of the candidates in both theory and practical aspects will help the candidate in the improvement of his/her knowledge skills & attitude.

COMPETENCY ASSESSMENT:

Overall:

1. Communication / Commitment / Contribution / Compassion towards patients and Innovation	-	10 Marks
2. Implementation of Newly learnt techniques	-	10 Marks
3. Documentation of case sheets / discharge Summary / Review	-	10 Marks
4. Number of cases presented in Clinical Meetings/ Journal Clubs / Seminars / Papers presented in Conference.	-	10 Marks
5. No. Of Medals/ Certificates won in the conference / Quiz competitions and other academic meetings with details.	-	10 Marks

Total		50 Marks

Assessment	I	- February	-	First Year
	II	- August	-	First Year
	III	- February	-	Second Year
	IV	- August	-	Second Year
	V	- February	-	Third Year
	VI	- May	-	Third Year

VIVA INCLUDING COMPETENCY ASSESSMENT – 100 Marks (50+50)

THEORY EXAMINATION:

Paper – I Basic Sciences Structure and function of haemopoietic system, Molecular biology and Genetic aspects of haemopoiesis

Paper – II Laboratory Haematology

Paper – III Clinical Haematology

Paper - IV Recent Advances in Haematology

Each paper will contain:

1. Essay questions (2)	-	2 X 15	=	30 Marks
2. Short Notes (10)	-	10 X 7	=	70 Marks
Total				100 Marks

PRACTICAL SCHEME:

Particulars	Time for candidate to examine the cases	Time for examiners to question the candidates	Maximum Marks
Long Case	1 Case X 60 minutes	60 Minutes	100
Short Case	2 Cases X 15 Minutes	30 Minutes	100

Ward Rounds	3 Patients X 10Minutes	30 Minutes	50
Laboratory Haematology	Immunohematology including interpretation of slides and raw data (75 Marks) Wet practicals(25 Marks)	3 hours 1 hour	100
Viva Voce		15 Minutes	100
Log Book			50
Total Marks			500

As per Medical Council of India Post Graduate Medical Education Regulations 2000 (amended upto 10th August 2016) clause **13.9 A Postgraduate student of a Postgraduate degree Course in broad specialties/Super Specialties would be required to present one poster presentation to read one paper at a National/State conference and to present one Research paper which should be published/accepted for publication/sent for publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate Degree Examination.**

Apart from Poster/Oral paper presentation in National/State conferences, the Research paper published by the candidate in the University Journal of Medical Sciences will be considered as equivalent to the Research Paper as mentioned in 13.9. clause. Case Reports can also be published in University Journal of Medical Sciences but case reports will not be considered as Research Paper.

The candidate can also present Research Paper as per Clause 13.9 of Post Graduate Education Regulation 2000, and if the article sent for publication by the candidate as primary author or corresponding author

which has not yet been published/accepted for publication, the candidate should submit a letter from the HOD, stating that the article sent for publication is of publishable merit and the proof of the Research Article submitted to the Journal for publication should be sent to the university forwarded through the HOD [as per 53rd SAB]

The student can submit articles for the University journal anytime from the time of registration in the University till 6 months prior to his theory examination.

REFERENCE BOOKS:

1. Dacie and Lewis: Practical Haematology
2. Hoffman textbook of Hematology
3. Hoffbrand textbook of Hematology

****Note: The editions are as applicable and the latest editions shall be the part of the syllabi.**

JOURNALS:

1. Blood
2. British Journal of Haematology
3. Indian Journal of Hematology and Transfusion Medicine
4. Bone Marrow Transplant
5. Biology of Blood and Marrow Transplant
6. Journal of Thrombosis and Hemaostasis

D.M. - NEONATOLOGY

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI
Syllabus – D.M. Neonatology

1. AIMS:

The term “Neonatology” includes diseases of the foetus and neonate including the maternal influences on the fetus and perinatal interventions.

The aim of the DM Programme is to provide advanced training in neonatology to produce competent super-specialists who are able to provide clinical care of the highest order to newborn infants, and serve as future teachers, trainers, researchers and leaders in the field of Neonatology.

2. OBJECTIVES:

After completing the DM (Neonatology) course, the student should be able to:

1. Analyse neonatal health problems scientifically, taking into account the biological basis as well as the epidemiology of perinatal-neonatal disease, and advise and implement strategies aimed at prevention of neonatal morbidity and mortality.
2. Provide primary, secondary and tertiary care to all newborn infants including intensive care of the highest standard to the critically sick and the very low birth weight neonates using advanced therapeutic and supportive modalities and skills.
3. Implement a comprehensive follow up and early intervention programme for the ‘at risk’ newborn infants, and plan, counsel and advise rehabilitation of the Neuro developmentally challenged infants.
4. Take rational decisions in the face of ethical dilemmas in neonatal- perinatal practice.
5. Exhibit communication skills of a high order and demonstrate compassionate attributes befitting a caring neonatologist.
6. Plan and carry out research in neonatal health in clinical, community and laboratory settings.
7. Teach newborn care to the medical and the nursing students as well as grassroots health functionaries, and develop learning resource materials for them.
8. Plan, establish and manage level II and level III neonatal units independently.

9. Use and maintain the essential neonatal equipment and keep abreast with advances in newborn care technology.

10. Organize newborn care in the community and at the secondary level of health system, and play the assigned role in the national programmes aimed at the health of mothers and their infants.

11. Work as a productive member of the interdisciplinary team consisting of Obstetricians, Paediatricians, Paediatric Surgeons, other doctors, nurses, and grassroots functionaries providing care to the pregnant mother, the fetus and the newborn in any setting of health care system.

12. Seek and analyse new literature and information on neonatology, update the concepts, and practise evidence-based neonatology.

3. THEORY SYLLABUS:

A) BASIC SCIENCES

Basic genetics

- Foetal and neonatal immunology
- Mechanism of disease
- Applied Anatomy and Embryology
- Feto-placental Physiology
- Neonatal adaptation
- Development and maturation of lungs, respiratory control, lung functions, ventilation, gas exchange, ventilation perfusion.
- Physiology and development of cardiovascular system, developmental defects, physiology and hemodynamics of congenital heart disease.
- Fetal and intrauterine growth.
- Development and maturation of nervous system, cerebral blood flow, blood brain barrier.
- Fetal and neonatal endocrine physiology
- Developmental pharmacology
- Developmental hematology, bilirubin metabolism
- Renal physiology
- Physiology of gastrointestinal tract, digestion, absorption.
- Electrolyte balance
- Metabolic pathways pertaining to major and minor nutrients
- Biochemical basis of inborn errors of metabolism

GENERAL TOPICS

- Research methodology

- Biostatistics
- Review of evidence, evidence based care, critical appraisal of scientific material.
- Ethics in perinatology/neonatology
- Principles of education (objectives, curriculum, assessment and use of media)
- Computers, information technology, internet

C) PERINATOLOGY

- Perinatal and neonatal mortality, morbidity, epidemiology.
- High risk pregnancy: detection, monitoring and management.
- Fetal monitoring, clinical, electronic; invasive, and non-invasive
- Intrapartum monitoring and procedures
- Assessment of foetal risk, and decision for termination of pregnancy
- Diagnosis and management of foetal diseases
- Medical diseases affecting pregnancy and foetus, psychological and ethical considerations
- Foetal interventions.
- Foetal origin of adult disease

D) NEONATAL RESUSCITATION

E) NEONATAL VENTILATION

- Non invasive ventilation
- Basic modes of ventilation
- Advanced modes of ventilation including High frequency Ventilation
- ECMO (Extra Corporeal Membrane Oxygenation)
- Nitric Oxide Therapy

F) BLOOD GAS AND ACID BASE DISORDERS

G) NEONATAL ASSESSMENT AND FOLLOW UP

-
- Assessment of gestation, neonatal behaviour, neonatal reflexes.
- Developmental assessment, detection of neuro-motor delay, Early intervention/ Developmentally supportive care
- Immunization

H) BODY SYSTEMS

i) RESPIRATORY SYSTEM

- Neonatal airways: physiology, pathology; management
- Pulmonary diseases: Hyaline membrane disease, transient tachypnea, aspiration pneumonia, pulmonary air leak syndromes, pulmonary

haemorrhage.

- Developmental defects
- Oxygen therapy and its monitoring
- Pulmonary infections
- Miscellaneous pulmonary disorders.

ii) CARDIOVASCULAR SYSTEM

- Fetal circulation, transition from fetal to neonatal physiology
- Persistent Pulmonary Hypertension.
- Examination and interpretation of cardiovascular signs and symptoms
- Special tests and procedures (Echocardiography, angiography)
- Diagnosis and management of congenital heart diseases
- Rhythm disturbances
- Hypertension in neonates
- Shock: pathophysiology, monitoring, management.

iii) GASTROINTESTINAL SYSTEM

- Disorders of liver and biliary system.
- Bilirubin metabolism
- Neonatal jaundice: diagnosis, monitoring, management, phototherapy, exchange transfusion.
- Prolonged hyperbilirubinemia
- Kernicterus
- Congenital malformations
- Necrotising enterocolitis

iv) NUTRITION

- Fetal nutrition
- Physiology of lactation
- Breast feeding
- Lactation management, breast milk banking, maternal medications and nursing
- Parenteral nutrition
- Vitamins and micronutrients in newborn health

v) RENAL SYSTEM

- Developmental disorders
- Renal functions
- Fluid and electrolyte management
- Acute renal failure (diagnosis, monitoring, management).

vi) ENDOCRINE AND METABOLISM

- Glucose metabolism, hypoglycemia, hyperglycemia
- Calcium disorders

- Magnesium disorders
- Thyroid disorders
- Adrenal disorders
- Disorders of sexual differentiation
- Inborn errors of metabolism

vii) HEMATOLOGY

- Physiology
- Anemia
- Polycythemia
- Bleeding and coagulation disorders
- Rh hemolytic disease
- Use of blood products

viii) NEUROLOGY

- Clinical neurological assessment
- EEG, ultrasonography, CT scan
- Neonatal seizures
- Intracranial hemorrhage
- Brain imaging
- Hypoxic ischemic encephalopathy
- Neuro-muscular disorders
- CNS malformation
- Therapeutic Hypothermia and other Neuro modulatory therapies

ix) SURGERY AND ORTHOPAEDICS

- Diagnosis of neonatal surgical conditions
- Pre and post operative care
- Neonatal anaesthesia
- Metabolic changes during anaesthesia and surgery
- Orthopaedic problems

x) NEONATAL INFECTIONS

- Intrauterine infections
- Superficial infections
- Diarrhea
- Sepsis/Meningitis
- Osteomyelitis and septic arthritis
- Pneumonias
- Perinatal HIV
- Miscellaneous infective disorders including HBV and fungal

infections
xi) NEONATAL IMAGING
X-rays, ultrasound, MRI, CT Scan etc.

xii) NEONATAL OPHTHALMOLOGY
• Developmental aspects
• Retinopathy of prematurity
• Sequelae of perinatal infections

xiii) Neonatal Dermatology

I) TRANSPORT OF NEONATES

J) NEONATAL PROCEDURES

K) DEVELOPMENTAL ASSESSMENT AND FOLLOW UP

L) ORGANIZATION OF NEONATAL CARE

- Principles of design of Neonatal Unit
- Organisation of Primary/Secondary and Tertiary level Neonatal care

M) CLINICAL GENETICS

- Pre-implantation and fetal diagnosis
- Principles of dysmorphology
- Diagnosis of Genetic disorders
- Management and Organization of follow up care of newborn with genetic defects.

N) COMMUNITY NEONATOLOGY

- Vital statistics, health system;
- Causes of neonatal, perinatal death
- Neonatal care priorities
- Care at secondary level of care
- Care at primary health centre
- Role of different health functionaries
- National programmes
- National Neonatology Forum

O) **Bioethics**

1. Respect human life and the dignity of every individual.
2. Refrain from supporting or committing crimes against humanity and condemn all such acts.

3. Treat the sick and injured with competence and compassion and without prejudice and apply the knowledge and skills when needed.
4. Protect the privacy and confidentiality of those for whom we care and breach that confidence only when keeping it would seriously threaten their health and safety or that of others.
5. Work freely with colleagues to discover, develop, and promote advances in medicine and public health that ameliorate suffering and contribute to human well being.
6. Educate the public about present and future threats to the health of humanity.
7. Advocate for social, economic, educational and political changes that ameliorate suffering and contribute to human well being.
8. Teach and mentor those who follow us, for they are the future of our caring profession.

4. CLINICAL TRAINING:

The total period of DM course is 36 months. Of this, at least three fourths (27 months) will be spent in the newborn service, 6 months will be meant for essential rotations in related specialties and the rest 3 months will be apportioned for either optional rotations or for the newborn service.

Newborn services (27 months)

The candidates will have at least 27 months of posting in the newborn services at concerned institutions. The candidates must get adequate exposure to Neonatal follow up, neonatal emergencies, delivery room care of neonates and acquisition of practical skills and management strategies related to all levels of neonatal care

Essential Rotations (6 months)

The candidate must have mandatory adequate exposure in the following fields. The duration of posting in each department or service can be decided by the individual departments based on whether training can be given within the department itself or the candidate needs specified external posting.

The 6 months can be apportioned to the following postings:

- Community Neonatology
- Perinatology/ Obstetrics (Dept. of Obstetrics)
- Neonatal surgery (Dept of Pediatric Surgery)
- Perinatal Cardiology and functional echocardiography
- Ultrasonography and imaging
- Child development clinic/ Developmental Pediatrics

Optional rotations (3 months)

The candidates can undertake up to 2 months elective rotation at the parent or other institutions of higher repute.

During II year, students are encouraged to undergo special postings for learning new advanced techniques / Procedure / Skills in institutions of higher repute where the requisite facilities are available without affecting the duties of the parent department.

The departments will have the flexibility of additional rotations for up to 1 month in the above mentioned disciplines or in other relevant areas (such as neonatal Cardiac Surgery, Genetics, Perinatal-pathology, Anaesthesiology, Neonatal Ophthalmology, Research etc.) depending upon the strength of the disciplines and functional requirements at the concerned institutions. [Under no circumstances however, would the training in neonatal services be of less than 27 months i.e. three fourths of the total course.]

5. SKILL TRAINING REQUIREMENTS:

The DM Candidate has to acquire certain skills which are certifiable along with practical skills which are acquired during day to day training within the department. In order to ensure Uniformity in acquiring these skills, the Log book for DM Neonatology course will have the uniform configuration for all colleges within the university.

Year of study	Certifiable skills	Practical skills
I year	Mandatory: Neonatal Resuscitation Program (NRP) Basic Epidemiology/Research Methodology	• Neonatal examination, anthropometry and developmental assessment • Neonatal resuscitation • Neonatal ventilation : CPAP, IMV; newer modes of ventilation • Blood sampling : Capillary, venous, arterial
II year	Mandatory: Developmental assessment (DASII/BSID/Griffiths etc) Neonatal Ventilation (Basic) Neonatal Ventilation (Advanced)	• Insertion of peripheral venous, umbilical venous and umbilical arterial catheters • Insertion of central venous catheter • Monitoring : invasive, non-invasive • Enteral feeding (katori-spoon, gavage, breast) • Lactation management • Parenteral nutrition • Lumbar puncture and ventricular tap • Insertion of intercostal

		drainage tube • Exchange transfusion • Neonatal drug therapy • Nursery housekeeping routines and asepsis procedures • Universal precautions • Handling, effective utilization and trouble shooting of neonatal equipment.
III year	Optional certification: Lactation Management Enteral & Parenteral Nutrition Developmentally supportive care ECMO Therapeutic Hypothermia Neonatal Neurology Functional Echocardiography Brain Imaging.	I) Organization of Multidisciplinary team and management J) Communication with parents, families and communities K) Teaching skills : lectures, tutorials L) Participatory and small group learning skill M) Principles of educational objectives, assessment and media N) Preparing learning resource material O) Understanding Ethical Dilemmas

6. TEACHING METHODOLOGY:

Learning in D.M. Neonatology will essentially be self-directed and will take place while working in various areas and through interactions in the rounds.

Following minimum formal sessions are recommended in order to facilitate and supplement the efforts of the faculty and students :

- Ward rounds – daily
- Developmental follow up clinics - twice a week
- Journal club (once in 2 weeks)
- Perinatal round (once in 2 weeks)
- Perinatal Mortality meet (once in a month)
- Seminar (once in 2 weeks)
- Clinical case discussion (once a week)

- Protocol Development or discussion (Once a month)
- Neonatal Surgery Rounds
- Neonatal Morbidity and mortality meet (once a month)
- Radiology rounds
- In addition, depending on the strength of the institution, Imaging, Pathology, Microbiology, as well as interdepartmental Seminars may be undertaken.

7. RESEARCH WORK:

The candidate should be trained in the ability to

- Frame a research question.
- Plan a study to answer the question.
- Collect the relevant information and
- Evaluate appropriately the collected data to draw a conclusion.

The candidate should become conversant with the reporting of these results as a research paper, in journals and as a presentation in conferences.

Students should compulsorily attend Research methodology workshop conducted by the University within first six months of D.M. Course.

8. LOG BOOK:

The Postgraduate student of a Postgraduate Degree Course in Super specialties shall maintain Log Book of the work carried out by them and the training programme undergone during the period of training including details of surgical operations assisted or done independently by.

The Log Book shall be checked and assessed by the faculty members imparting the training.

Periodical evaluation of Log Book to be done by the Head of the Department as per 52nd SAB.

The Evaluation of the candidates in both theory and practical aspects will help the candidate in the improvement of his/her knowledge skills & attitude.

9. COMPETENCY ASSESSMENT

Overall:

1. Communication / Commitment / Contribution /

Compassion towards patients and Innovation	-	10 Marks
2. Implementation of Newly learnt techniques	-	10 Marks
3. Documentation of case sheets / discharge Summary / Review	-	10 Marks
4. Number of cases presented in Clinical Meetings/ Journal Clubs / Seminars / Papers presented in Conference.	-	10 Marks
5. No. Of Medals/ Certificates won in the conference / Quiz competitions and other academic meetings with Details.	-	10 Marks

Total 50 Marks

Assessment I	- February	-	First Year
II	- August	-	First Year
III	- February	-	Second Year
IV	- August	-	Second Year
V	- February	-	Third Year
VI	- May	-	Third Year

VIVA INCLUDING COMPETENCY ASSESSMENT – 100 Marks (50+50)

10. THEORY EXAMINATION

Paper I Applied Basic Sciences as applied to Neonatology and Perinatology; Research Methods

Paper II Clinical Neonatology

Paper III Clinical Neonatology and Neonatal Intensive Care including Neonatal Transport

Paper IV Community Neonatology, National MCH Programmes, Allied disciplines, Neuro development follow up, Recent Advances, Rehabilitation etc.,

Each paper will contain:

1. Essay questions (2)	-	2 X 15 =	30 Marks
2. Short Notes (10)	-	10 X 7 =	70 Marks
Total			100 Marks

11. CLINICAL EXAMINATION:

Particulars	Time for candidate to examine the cases	Time for Examiners to question the candidate	Maximum Marks
Long case(1 patient)- Neonate receiving intensive care	45 minutes	45 Minutes	100
Short case I- Growing preterm	30 Minutes	30 Minutes	50
Short case II – Developmental follow up	45 minutes	30 minutes	50
Ward rounds (3 patients)	10 minutes each patient	10 minutes each patient	100
OSCE – 5 stations	3 minutes each station	15 minutes	50
Viva Voce		15 minutes	100
Log book			50
Total marks			500

As per Medical Council of India Post Graduate Medical Education Regulations 2000 (amended upto 10th August 2016) clause 13.9 A Postgraduate student of a Postgraduate degree Course in broad specialties/Super Specialties would be required to present one poster presentation, to read one paper at a National/State conference and to present one Research paper which should be published/accepted for publication/sent for publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate Degree Examination.

Apart from Poster/Oral paper presentation in National/State conferences, the Research paper published by the candidate in the University Journal of Medical Sciences will be considered as equivalent to the Research Paper as mentioned in 13.9. clause. Case Reports can also be published in University Journal of Medical Sciences but case reports will not be considered as Research Paper.

The candidate can also present Research Paper as per Clause 13.9 of Post Graduate Education Regulation 2000, and if the article sent for publication by the candidate as primary author or corresponding author which has not yet been published/accepted for publication, the candidate should submit a letter from the HOD, stating that the article sent for publication is of publishable merit and the proof of the Research Article submitted to the Journal for publication should be sent to the university forwarded through the HOD [as per 53rd SAB]

The student can submit articles for the University journal anytime from the time of registration till 6 months prior to theory examination.

12. OSCE: 5 Stations

The OSCE will constitute 5 stations:

Station I : Imaging

Station II: Counselling and communication

Station III: Intensive care scenario

Station IV: Investigations (ECG, BERA, EEG, ABG etc)

Station V: General Neonatology / BIOSTATISTICS.

13. REFERENCE BOOKS:

Avery's Neonatology

Rennie & Robertson's Text Book of Neonatology

Klaus & Fanaroff's Care of the high risk neonate

Avery's Diseases of the new born

Cloherty's Manual of neonatal care

Remington & Klein's Infectious diseases of the fetus and newborn infants -

Neonatal heart disease- Robert M Freedom

The normal child - Illingworth

The development of the infants and young child - Illingworth

Polin and Fox- Fetal and neonatal physiology

Hematologic problems of the neonate- Robert D Christensen

Dubowitz's The neurological assessment of the preterm & full term new born

infants- Fetal and neonatal neurology and neuro surgery- Levene

Echocardiography for the neonatologist- Jonnathan Skinner

Assisted ventilation of the neonate - Goldsmith

Neonatal respiratory disorders - Greenough

Smith's recognizable patterns of human malformation

Smith's recognizable patterns of human deformation

Care of the new born – Meherban Singh

Martin & Fanaroff 's Neonatal perinatal medicine.

Questions & Controversies- Richard Polin ed.

Gastroentrology and nutrition neonatology

Nephrology and fluid electrolyte physiology

The new born lung

Hematology immunology and infection disease

Neurology

Cardiology

Neurology of the newborn – Joseph Volpe

Neonatal resuscitation text book - AAP

Drugs in pregnancy and lactation – Gerald G Briggs

Physical diagnosis in neonatology – Mary Ann Fletcher

Moss & Adam's Heart disease in infants children & adolescents –

Caffey's Pediatric diagnosis
Evidence based neonatal infections- David Isaacs

****Note:** The editions are as applicable and the latest editions shall be the part of the syllabi.

14. JOURNALS:

INTERNATIONAL

Journal of Perinatology
Journal of Perinatal medicine
Clinics in Perinatology
Early human development
Neo reviews
Seminar in fetal & neonatal medicine
Archives of diseases in childhood – Fetal & Neonatal edition
Neonatology
Neonatal Network
Pediatrics
Journal of Pediatrics

NATIONAL

Journal of Neonatology
Indian Pediatrics
Indian Journal of Pediatrics

D.M. - HEPATOLOGY

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI

Syllabus – D.M. - HEPATOLOGY

1.AIMS & OBJECTIVES:

To train competent specialists in the specialty of Hepatology, to improve care of patients with liver diseases.

2.THEORY SYLLABUS:

To train postgraduates in clinical, molecular, intensive care and transplant Hepatology so that they will be able to understand the subject better to diagnose, investigate, treat and prevent the diseases independently in all types of hepatobiliary disorders, thus improving patient care.

Syllabus

- Structure of liver, pancreas and biliary system
- Functions of liver, pancreas and biliary system
- Pathology of liver, pancreas and biliary system
- Investigations of hepatobiliary diseases
- Basic immunology
- Molecular biology
- Epidemiology
- Cirrhosis
- Non cirrhotic portal hypertension
- Portal hypertension and GI bleeding
- Ascites and renal dysfunction in liver disease
- Hepatic encephalopathy
- Non parasitic cystic diseases
- Viral infection of liver (Acute and chronic viral hepatitis)
- Other infections of liver
- Immune disorders of liver
- Alcoholic liver disease
- Liver transplantation
- Non alcoholic fatty liver
- Drug induced liver injury
- Acute liver failure
- Inherited metabolic disorder
- Vascular disorders of liver
- Tumors of liver and bile duct
- Biliary tract disease
- Liver in diseases of other systems
- Effect of liver disease on other systems
- Pediatric liver disease
- Liver disease in elderly
- Liver disease in pregnancy
- Use of antiviral and immunosuppressive agents in treatment of liver disease
- Nutrition in liver disease

- Liver pathology
- Liver imaging
- Diseases of the pancreas
- Principles of experimental design, clinical biostatistics and epidemiology
- This syllabus would be regularly covered by didactic lectures, literature review and research
- Seminars.

Practical

- Liver biopsy
Percutaneous Transjugular
- Ascitic tap
- Upper GI endoscopy
Variceal band ligation Variceal glue injection Sclerotherapy of varices
- ERCP
Diagnostic Nasobiliary drainage Biliary stenting Stone retrieval
- Lower GI endoscopy
Diagnostic, full length Banding
Sclerotherapy of rectal varices
- Ultrasound
Imaging of liver and biliary tree
Doppler assessment of portovenous system Guided abscess drainage
Percutaneous transhepatic biliary drainage

Bioethics

1. Respect human life and the dignity of every individual.
2. Refrain from supporting or committing crimes against humanity and condemn all such acts.
3. Treat the sick and injured with competence and compassion and without prejudice and apply the knowledge and skills when needed.
4. Protect the privacy and confidentiality of those for whom we care and breach that confidence only when keeping it would seriously threaten their health and safety or that of others.
5. Work freely with colleagues to discover, develop, and promote advances in medicine and public health that ameliorate suffering and contribute to human well being.
6. Educate the public about present and future threats to the health of humanity.
7. Advocate for social, economic, educational and political changes that ameliorate suffering and contribute to human well being.
8. Teach and mentor those who follow us, for they are the future of our caring profession.

3. CLINICAL TRAINING:

The Students will be clinically trained in parent department during the 3 years course. The candidates would also be trained for the following:

- Understand ethical issues in human and animal research
- Perform independently a research project and publish a scientific paper in an indexed journal
- Collect and analyze data on liver diseases
- Set up independent units of Hepatology in the country

Duration of Course: Three years

Time Schedule of postings

Joint Programmes with other departments

Sl. No	Meetings	Suggested frequency	minimum
1.	Morbidity & mortality review	Once in a month	Once in a
2.	Multi-disciplinary team (Radiology, Pathology, Surgeon)	Once in a week	
3.	Clinico-pathological correlation (CPC)	Once in a month	

Departmental

Teaching rounds	2 per week
Journal Club	1 per week
Seminar meet	1 per week
Bedside clinic	1 per week

Proposed time to be spent by DM students in various sections

Sl. No	Area/ Field	Suggested duration	minimum
Mandatory posting (26 months)			
1.	Hepatology (includes Pediatric Hepatology, Endoscopy etc.)	20 months	
2.	Liver-ICU	6 months	
Elective/ Peripheral posting (10 months)*			
1.	Gastroenterology	3 months	
2.	Liver transplant unit	6 months (2 months per year of training)	
3.	Experimental/ Molecular Hepatology	1 week	
4.	Virology	1 week	
5.	Histopathology	1 week	
6.	Radiology	1 week	

*If needed, part of the peripheral posting can be in other Institutions.

Patient service programme:

1. Indoor bed strength 20
2. Clinics: minimum of 2 days / week

Proposed training:

Inpatient services: The DM Candidate will work as part of the total liver service. He/She will look after the workup of admitted patients and take part in ward rounds by the assistant

professor and professor . The candidate will supervise the activities of Junior Residents and undertake teaching of liver and biliary diseases to them. The candidate will perform all diagnostic procedures as enumerated below and attend to consultation calls and hepatic emergencies of other units.

Outpatient Clinics: The DM candidate will work in minimum of 2 days/week of out patient clinics.

Liver lab: Candidate would spend a minimum of 1 month each in liver lab, and 2 months in experimental medicine. The candidate would be given training in laboratory techniques including ELISA, PCR, RFLP and LFTs. Molecular Hepatology is the new thrust area in Hepatology. Candidates would associate themselves with the research work going on in the department.

During II year, students are encouraged to undergo special postings for learning new advanced techniques / Procedure / Skills in institutions of higher repute where the requisite facilities are available without affecting the duties of the parent department.

4. SKILL TRAINING :

1st year

	Should have observed (minimum numbers)	Should have assisted (minimum numbers)	Should have performed (minimum numbers)
Gastroscopy- Diagnostic	-	Yes	Yes (50)
Gastroscopy- Therapeutic (including sclerotherapy, glue injection and variceal band ligation)	Yes (10)	Yes (5)	-
Colonoscopy - Diagnostic	Yes	Yes (20)	-
Liver biopsy (Percutaneous/ Transjugular)	Yes	Yes (10)	-
Side viewing Endoscopy / ERCP (including biliary stenting or NBD drainage, Stone extraction)	-	-	-
Ultrasound of liver and biliary tract(including hemodynamic studies with duplex Doppler)	Yes (10)	-	-
Invasive hemodynamics (including hepatic venous pressure gradient)	-	-	-
Intensive care management of liver patients (including subclavian and transjugular catheterization and	Yes	Yes	Yes (10)

ventilator use)			
Pre and post Liver transplantation (including follow up)	Yes	-	-

2nd year

	Should have observed	Should have assisted	Should have performed
Gastroscopy- Diagnostic	-	-	Yes (100)
Gastroscopy- Therapeutic (including sclerotherapy, glue injection and variceal band ligation)	Yes	Yes	Yes (50)
Colonoscopy - Diagnostic	Yes	Yes	Yes (20)
Liver biopsy (Percutaneous/ Transjugular)	Yes	Yes (10)	-
Side viewing Endoscopy / ERCP (including biliary stenting or NBD drainage, Stone extraction)	Yes (5)	-	-
Ultrasound of liver and biliary tract(including hemodynamic studies with duplex Doppler)	Yes	Yes (10)	-
Invasive hemodynamics (including hepatic venous pressure gradient)	-	-	-
Intensive care management of liver patients (including subclavian and transjugular catheterization and ventilator use)	Yes	Yes	Yes (10)
Pre and post Liver transplantation (including follow up)	Yes	Yes	-

3rd year

	Should have observed	Should have assisted	Should have performed
Gastroscopy- Diagnostic	-	Yes	Yes (100)
Gastroscopy- Therapeutic (including sclerotherapy, glue injection and variceal band ligation)	Yes	Yes	Yes (50)
Colonoscopy - Diagnostic	Yes	Yes	Yes (50)

Liver biopsy (Percutaneous/Transjugular)	Yes	Yes (10)	-
Side viewing Endoscopy / ERCP (including biliary stenting or NBD drainage, Stone extraction)	-	Yes (20)	Yes (10)
Ultrasound of liver and biliary tract(including hemodynamic studies with duplex Doppler)	Yes	-Yes (10)	-
Invasive hemodynamics (including hepatic venous pressure gradient)	-	Yes (10)	-
Intensive care management of liver patients (including subclavian and transjugular catheterization and ventilator use)	Yes	Yes	Yes (10)
Pre and post Liver transplantation (including follow up)	Yes	Yes	Yes

5.TEACHING METHODOLOGY

Ward / OPD patient management.

Peri operative Management
Assisting / performing operative procedures.

Long and short topic presentations.

Ward rounds, case presentations and discussions. Combined ward rounds with Medical Gastroenterologist.

Clinicoradiological and clinicopathological conferences.

Inter-departmental Periodical meeting on relevant topics with Department of Anatomy, Physiology, Bio-chemistry and Microbiology.
Journal club.

Research review.

Problem solving sessions.

Weekly Tumour Board discussions with Radiation and Medical Oncologist.

Guest and in-house lectures. Conferences, seminars and CME's.

Participation in workshops, etc.

Teaching undergraduates / postgraduates / paramedical staff.

Weekly Surgical audit (patient care review meeting).

Biomedical equipments use and maintenance.

Bio-ethics

6.RESEARCH WORK:

The candidate will be trained in the ability to

- Frame a research question.
- Plan a study to answer the question.
- Collect the relevant information and
- Evaluate appropriately the collected data to draw a conclusion.

The candidate should become conversant with the reporting of these results as a research paper, in journals and as a presentation in conferences.

The activities would consist of:

Planning and organizing relevant animal / clinical studies to be submitted as a dissertation at the end of the course.

Students should attend Research Methodology workshop within first six months of D.M Course conducted by the University.

7.LOG BOOK:

The Postgraduate student of a Postgraduate Degree Course in Super specialties shall maintain Log Book of the work carried out by them and the training programme undergone during the period of training including details of surgical operations assisted or done independently.

The Log Book shall be checked and assessed by the faculty members imparting the training.

Periodical evaluation of Log Book to be done by the Head of the Department as per 52nd SAB.

The Evaluation of the candidates in both theory and practical aspects will help the candidate in the improvement of his/her knowledge skills & attitude.

8. COMPETENCY ASSESSMENT

OVERALL:

- | | |
|--|------------|
| 1) Communication/ Commitment/Contribution/
Compassion towards Patients and Innovation | - 10 Marks |
| 2) Implementation of newly learnt techniques | – 10 Marks |
| 3) Documentation of case sheets/discharge
summary/Review | – 10 Marks |
| 4) Number of cases presented in Clinical
Meetings/ Journal clubs / Seminars/ Papers
presented in conferences | – 10 Marks |
| 5) No. Of Medals / Certificates won in the
conference/Quiz competitions and other academic
meetings with details | - 10 Marks |

50 Marks

Assessment I - February - First year
II - August - First year
III - February - Second Year
IV - August - Second year
V - February - Third Year
VI - May - Third Year

VIVA INCLUDING COMPETENCY ASSESSMENT – 100 Marks (50+50)

9.THEORY EXAMINATION:

Theory paper

Paper I :Applied Basic Science of Liver and Biliary System including Pancreas

Paper II: Paediatric Hepatology

Paper III: Practice of Hepatology and Pancreatic Diseases

Paper IV: Recent advances in Hepatobiliary and Pancreatic systems

Each paper will contain:

- | | | | |
|------------------------|---|----------|-----------|
| 1. Essay questions (2) | - | 2 X 15 = | 30 Marks |
| 2. Short Notes (10) | - | 10 X 7 = | 70 Marks |
| | | | ----- |
| Total | | | 100 Marks |
| | | | ----- |

10. CLINICAL EXAMINATION:

Particulars	Time for candidate to examine the cases	Time for examiners to question the candidates	Maximum Marks
Long Case	1 Case x 60 Minutes	60 Minutes	100
Short Case	2 Cases x 15 Minutes	30 Minutes	100
Ward Rounds	3 Patients x 10 Minutes	30 Minutes	100
OSCE	5 Stations x 3 Minutes	15 Minutes	50
Viva Voce		15 Minutes	100
Log Book			50
			500

As per Medical Council of India Post Graduate Medical Education Regulations 2000 (amended upto 10th August 2016) clause **13.9 A Postgraduate student of a Postgraduate degree Course in broad specialties/ Super Specialties would be required to present one poster presentation to read one paper at a National/State conference and to present one Research paper which should be published/accepted for publication/sent for publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate Degree Examination.**

Apart from Poster/Oral paper presentation in National/State conferences, the Research paper published by the candidate in the University Journal of Medical Sciences will be considered as equivalent to the Research Paper as mentioned in 13.9. clause. Case Reports can also be published in University Journal of Medical Sciences but case reports will not be considered as Research Paper.

The candidate can also present Research Paper as per Clause 13.9 of Post Graduate Education Regulation 2000, and if the article sent for publication by the candidate as primary author or corresponding author which has not yet been published/accepted for publication, the candidate should submit a letter from the HOD, stating that the article sent for publication is of publishable merit and the proof of the Research Article submitted to the Journal for publication should be sent to the university forwarded through the HOD [as per 53rd SAB]

The student can submit articles for the University journal anytime from the time of registration till 6 months prior to theory examination.

11.OSCE: 5 Stations

1. Clinical photograph / scenario
2. Radiology
3. Endoscopic Photograph

4. Pathology / histology
5. Specialised liver tests

12.RECOMMENDED READING

Journals of Hepatology

1. Seminars in Liver Diseases
2. Liver Clinics of North America
3. Journal of viral hepatitis
4. Journal of Gastroenterology and Hepatology
5. Gastroenterology
6. Gut
7. Digestive Disease Sciences
8. GI Endoscopy
9. Endoscopy
10. Indian Journal of Gastroenterology
11. Journal of Clinical and Experimental Hepatology
12. Tropical Gastroenterology
13. GE Clinics of North America
14. Lancet
15. NEJM
16. Journal of Clinical Nutrition
17. Journal of Critical Care Management
18. European Journal of Gastroenterology and Hepatology
19. Hepatogastroenterology

****Note:** The editions are as applicable and the latest editions shall be the part of the syllabi.

13. TEXTBOOKS IN HEPATOLOGY

1. Zakim' s Textbook of Hepatology
2. Sheila Sherlock Textbook of Hepatology
3. Schiffs' Textbook of Hepatology
4. Oxford Textbook of Hepatology
5. Yamada's Textbook of Hepatology
6. Sleseingers Textbook of Gastroenterology
7. Bockus Textbook of Gastroenterology
8. Busuttil's Transplantation of the Liver

D.M.- ENDOCRINOLOGY

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI

Syllabus - DM - Endocrinology

1.AIMS AND OBJECTIVES:

The aim and objectives for the DM (Endocrinology) course should comprehensively cover all aspects of Endocrinology and Metabolism during a period of three years of study. The student will acquire an exposure in training in the clinical, laboratory, research, outreach and epidemiological perspectives of endocrine disorders, and will acquire adequate skills to treat patients with these disorders on acquiring the degree of DM in Endocrinology.

2.THEORY SYLLABUS:

All aspects of endocrinology and metabolism will be covered in detail in terms of basic science, clinical knowledge and laboratory based concepts. Theoretical aspects of medical research and ethics in clinical practice will also be incorporated.

A three years training period designed to meet the minimum requirements for training in Endocrinology prior to certification.

Course and Curriculum of DM Endocrinology & Metabolism:

1. Basic Sciences as related to Clinical Endocrinology:
 - a. Hormone receptors / receptor biology
 - b. Genetics in Endocrinology
 - c. Molecular biology
 - d. Hormonal assays
2. Disorder of growth and sexual differentiation
3. Endocrine disorders in childhood and adolescence
4. Diabetes Mellitus
5. Hypothalamo – pituitary disorders
6. Thyroid disorders
7. Reproductive disorders and problems of menopause
8. Bone and mineral metabolism
9. Adreno-cortical and adreno-medullary disorders
10. Metabolic disorders (lipids, carbohydrates and protein metabolism related disorders, including inborn errors of metabolism).

Bioethics

1. Respect human life and the dignity of every individual.
2. Refrain from supporting or committing crimes against humanity and condemn all such acts.
3. Treat the sick and injured with competence and compassion and without prejudice and apply the knowledge and skills when needed.

4. Protect the privacy and confidentiality of those for whom we care and breach that confidence only when keeping it would seriously threaten their health and safety or that of others.
5. Work freely with colleagues to discover, develop, and promote advances in medicine and public health that ameliorate suffering and contribute to human well being.
6. Educate the public about present and future threats to the health of humanity.
7. Advocate for social, economic, educational and political changes that ameliorate suffering and contribute to human well being.
8. Teach and mentor those who follow us, for they are the future of our caring profession.

3. CLINICAL TRAINING:

The ethos of clinical training will focus on developing a candidate who has the ability to:-

- 1) Handle any patient with an endocrine or metabolic disorder as an individual.
- 2) Ability to function and develop multidisciplinary teams to function with:
 - a) Endocrine surgeons and nuclear medicine specialists in handling related clinical problems.
 - b) Work with the vascular surgeons, PMR physicians, orthotists and physiotherapists in driving the aspects of diabetes related foot care and a foot related clinic.
 - c) Developing a laboratory facility which can handle the hormonal and molecular aspects of endocrinology.
 - d) Personality development of the candidate to practice compassionate care in the assessment of their patients coupled with technology.
 - e) Leadership development.

All the candidates should be involved full-time in the direct care of the patients admitted to the endocrine services as resident staff. This will include taking a complete history, performing a comprehensive examination, ordering appropriate investigations and interpreting results. Additionally residents will be required to attend outpatient endocrine clinics where consultants will be available for on spot consultations. The residents will be expected to maintain a log book of seminars and journal clubs presented by them, and interesting cases (at least 20) which they have worked up in detail, and procedures performed during their tenure of 3 years.

Clinical / Laboratory Research:

Residents should be provided a 3 month exposure to hormone assays and clinical biochemistry lab in the Department of Endocrinology or in the central laboratory facilities in the institution so as to provide insight and hands on training in hormone assays and other laboratory techniques.

Training Programme:

I Postings:

1. Inpatient ward: 24 months
2. Interdepartmental consultations for admitted patients – 10 months
 - a. Biochemistry -2 weeks
 - b. Reproductive Medicine Unit – 1 week
 - c. Paediatric Endocrinology – 4 weeks
 - d. Molecular biology- 2 weeks
 - e. Thyroid USG – 5 days
 - f. FNAC – 8 days (2 hours each day)

II Speciality Clinics:

Students are encouraged to attend special clinics viz.,

- | | | |
|----|-----------------------------|-------------|
| a. | Foot clinic | once a week |
| b. | Adult Young diabetes clinic | once a week |
| c. | Menopause clinic | once a week |
| d. | Ophthalmology clinic | once a week |
| e. | Metabolic bone clinic | once a week |
| f. | Thyroid clinic | once a week |
| g. | Bariatric Clinic (Obesity) | once a week |

II. Multi-departmental meetings:

- A. Nuclear Medicine – Endocrine surgery
- B. Pathology- Endocrine surgery
- C. Neurosurgery- Endocrinology

During II year, students are encouraged to undergo special postings for learning new advanced techniques / Procedure / Skills in institutions of higher repute where the requisite facilities are available without affecting the duties of the parent department.

4. SKILL TRAINING REQUIREMENTS:

- a) Foundational clinical skills based on internal medicine concepts, and developed further to focus on the historical assessment and clinical examination of the endocrine system
- b) In depth theoretical knowledge of the functioning of the endocrine glands and the physiology of the endocrine systems.
- c) Ability to understand hormonal assays and setting them up in a laboratory setting.

Training in allied specialities:

Endocrine Radiology:

At least fortnightly meetings with Department of Radiology. These meetings will be conducted to discuss imaging, conventional and CT, MRI, or patients seen in the OPD and in-patient service.

Nuclear Medicine:

The residents will be given training in the principles of scanning of various endocrine organs and interpretation of isotope scans. Additionally, regular weekly conferences should be scheduled with the nuclear medicine department where faculty and the resident staff should discuss interesting scans of the previous week.

Training in Pathology:

It is primarily aimed at providing trainee insight into the area of endocrine-pathology such that the trainee will keep himself updated on emerging methods and trends in endocrine pathology.

Molecular biology courses:

It would be appropriate to provide the resident a one week exposure to molecular techniques as relevant to endocrinology. Procedures such as DNA extraction, PCR, RFLP, Southern blots and chromatography should be explained to the candidates.

5. TEACHING METHODOLOGY:

Ward / OPD patient management.

Peri operative Management
Assisting / performing operative procedures.

Long and short topic presentations.

Ward rounds, case presentations and discussions. Combined ward rounds with Medical Gastroenterologist.

Clinico-radiological and clinico-pathological conferences.
Inter-departmental Periodical meeting on relevant topics with Department of Anatomy, Physiology, Bio-chemistry and Microbiology.

Journal club.

Research review.

Problem solving sessions.

Weekly Tumour Board discussions with Radiation and Medical Oncologist.

Guest and in-house lectures. Conferences, seminars and CME's.

Participation in workshops, etc.

Teaching undergraduates / postgraduates / paramedical staff.

Weekly Surgical audit (patient care review meeting).

Biomedical equipments use and maintenance.

6. RESEARCH WORK:

The candidate will be trained in the ability to

- Frame a research question.
- Plan a study to answer the question.
- Collect the relevant information and
- Evaluate appropriately the collected data to draw a conclusion.

The candidate should become conversant with the reporting of these results as a research paper, in journals and as a presentation in conferences.

The activities would consist of:

Planning and organizing relevant animal / clinical studies to be submitted as a dissertation at the end of the course.

Students should compulsorily attend Research Methodology workshop conducted by the University within first six months of D.M. Course.

7. LOG BOOK:

The Postgraduate student of a Postgraduate Degree Course in Super specialties shall maintain Log Book of the work carried out by them and the training programme undergone during the period of training including details of surgical operations assisted or done independently by.

The Log Book shall be checked and assessed by the faculty members imparting the training.

Periodical evaluation of Log Book to be done by the Head of the Department as per 52nd SAB.

The Evaluation of the candidates in both theory and practical aspects will help the candidate in the improvement of his/her knowledge skills & attitude.

8.COMPETENCY ASSESSMENT:

Overall:

1. Communication / Commitment / Contribution / Compassion towards patients and Innovation	-	10 Marks
2. Implementation of Newly learnt techniques	-	10 Marks
3. Documentation of case sheets / discharge Summary / Review	-	10 Marks
4. Number of cases presented in Clinical Meetings/ Journal Clubs / Seminars / Papers presented in Conference.	-	10 Marks
5. No. Of Medals/ Certificates won in the conference / Quiz competitions and other academic meetings with details.	-	10 Marks

	Total	50 Marks

Assessment	I	- February	-	First Year
	II	- August	-	First Year
	III	- February	-	Second Year
	IV	- August	-	Second Year
	V	- February	-	Third Year
	VI	- May	-	Third Year

VIVA INCLUDING COMPETENCY ASSESSMENT – 100 Marks (50+50)

9. THEORY EXAMINATION:

Paper I	Basic Sciences of Endocrinology
Paper II	Clinical and Therapeutic Aspects of Endocrinology - Part I
Paper III	Clinical and Therapeutic Aspects of Endocrinology - Part II
Paper IV	Recent Advances and Trends in Endocrinology

Each paper will contain:

1. Essay questions (2)	-	2 X 15	=	30 Marks
2. Short Notes (10)	-	10 X 7	=	70 Marks
Total				----- 100 Marks -----

10. CLINICAL EXAMINATION:

Particulars	Time for candidate to examine the cases	Time for examiners to question the candidates	Maximum Marks
Long Case	1 Case x 60 Minutes	60 Minutes	100
Short Case	2 Cases x 15 Minutes	30 Minutes	100
Ward Rounds	3 Patients x 10 Minutes	30 Minutes	100
OSCE	5 Stations x 3 Minutes	15 Minutes	50
Viva Voce		15 Minutes	100
Log Book			50
			500

As per Medical Council of India Post Graduate Medical Education Regulations 2000 (amended upto 10th August 2016) clause **13.9 A Postgraduate student of a Postgraduate degree Course in broad specialties/Super Specialties** would be required to present one poster presentation to read one paper at a National/State conference and to present one Research paper which should be published/accepted for publication/sent for publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate Degree Examination.

Apart from Poster/Oral paper presentation in National/State conferences, the Research paper published by the candidate in the University Journal of Medical Sciences will be considered as equivalent to the Research Paper as mentioned in 13.9. clause. Case Reports can also be published in University Journal of Medical Sciences but case reports will not be considered as Research Paper.

The candidate can also present Research Paper as per Clause 13.9 of Post Graduate Education Regulation 2000, and if the article sent for publication by the candidate as primary author or corresponding author which has not yet been published/accepted for publication, the candidate should submit a letter from the HOD, stating that the article sent for publication is of publishable merit and the proof of the Research Article submitted to the Journal for publication should be sent to the university forwarded through the HOD [as per 53rd SAB]

The student can submit articles for the University journal anytime from the time of registration till 6 months prior to theory examination.

11. OSCE – 5 Stations With Examples:

1) Bioaesthesiometer as a demo instrument.

Question: How do you grade severe neuropathy with this instrument?

Answer: value greater than 40mV

2) Demonstration of Mixtard vial.

Question: How will an illiterate patient identify the kind of insulin in this bottle?

Answer: Orange brown colour indicates that it is a pre-mixed insulin.

3) X-ray of large pancreatic stones

Question: Name the commonest mutation that is the cause of this condition.

Answer: SPINK-1 mutation

4) Picture of optic fundus showing macular oedema

Question: What is the treatment for this condition?

Answer: Focal Grid laser.

5) Tube with lipaemic serum

Question: Name one endocrine condition where this can be accentuated in.

Answer: primary hypothyroidism.

Suggested Reading:

1. Williams Text book of Endocrinology
2. Joslin Diabetes Mellitus
3. Textbook of Diabetes (Holt's)
4. Metabolic basis of inherited disease (Stanbury)
5. The Thyroid (Ingbar)
6. RIA – Principles and practices (Pillai and Bhandarkar)
7. Reproductive Endocrinology (Speroff)
8. Textbook of Clinical Chemistry (Tietz)
9. Nutritive value of Indian Foods (Gopalan, ICMR)
10. Endocrinology (Leslie J DeGroot)
11. Pediatric Endocrinology (Hindmarsh and CGD Brook)

****Note:** The editions are as applicable and the latest editions shall be the part of the syllabi.

12. JOURNALS:

1. Journal of Clinical Endocrinology & Metabolism
1. European Journal of Endocrinology
2. Diabetes
3. Diabetes Care
4. Diabetologia
5. Fertility and sterility
6. Nature
7. Science
8. New England Journal of Medicine
9. The Lancet
10. Annals of Internal Medicine
11. Hormone and Metabolic Research
12. American Journal of Clinical Nutrition
13. British Medical Journal
14. Journal of Bone and Mineral Research
15. Clinical Endocrinology
16. Endocrine and Metabolic Clinics of North America
17. Endocrine Reviews
18. Endocrine Practice

D.M. - CARDIOLOGY

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI

Syllabus – D.M. CARDIOLOGY

1 AIMS:

The aim of the course is to impart thorough and comprehensive training to the candidate in the various aspects of cardiology so that at the end of the course he/she shall be able to perform the following Cognitive Domain:

1. Recognize the importance of Cardiology in the context of the health needs of the community and national priorities in the health sector.
2. Practice Cardiology ethically and in step with the principles of primary health care.
3. To be able to diagnose and manage cardiovascular diseases on the basis of clinical assessment, and appropriately selected and conducted investigations.
4. To be able to carry out efficient management of all types of cardiovascular Emergencies after quickly assessing the patient and synthesizing available clinical and Investigational information.
5. To be able to identify social, economic, environmental, biological and emotional determinants of health in a given case, and take them into account while planning therapeutic, rehabilitative, preventive, and promotive measures/strategies.
6. To keep abreast of the current knowledge and recent advances in the field by self learning and /or participating in Continuing Medical Education Programmes.
7. To organize and manage administrative responsibilities for routine day to day work as well as emergent /urgent situations
8. Demonstrate skills in documentation of individual case details as well as morbidity and mortality data relevant to the assigned situation.
9. To understand the functional principles of various biomedical equipments used in invasive and non invasive cardiology.
10. To develop understanding and working knowledge of the sophisticated and routine equipments and consumables used in Cardiology.
11. Demonstrate competence in basic concepts of research methodology, epidemiology and publication.
12. To be able to critically analyse relevant published research literature and use them appropriately to influence practice of cardiovascular medicine.

13. Develop skills in using educational methods and techniques as applicable to the teaching of medical/paramedical students/staff, general physicians and paramedical health workers. To be able to develop learning resource material for courses in cardiology.

14. To develop reasonable understanding of the recent advances in the allied specialities in the institution and be able to offer consultations to the other departments

2.OBJECTIVES:

Goal : The goal of DM Cardiology program is to provide specialized training in Cardiology to produce competent super specialists. These specialists will be capable of providing care of the highest order to the cardiac patients in the community as well as clinical tertiary care centres. They would subsequently serve as teachers, trainers, consultants, researchers and leaders in the field of Cardiology. They shall recognize the health needs of the community, carry out professional obligations ethically, in keeping with the objectives of the National Health Policy.

Learning Objectives: In general, the course is designed to train post graduates in DM (Cardiology) in major areas of cardiology like Clinical Cardiology, Coronary care, Paediatric Cardiology, Preventive Cardiology, Electrophysiology, Invasive diagnostic and therapeutic cardiac procedures and various non invasive diagnostic techniques and research activities.

OVERVIEW AND OBJECTIVES:

Clinical Cardiology training

Candidates shall be trained specifically in the art of bed side diagnosis. Curriculum is aimed to improve the overall clinical acumen in problem solving. Candidates will gain specific and focal management skills in all common clinical cardiology problem solving.

Specific skills

Candidates after completion of course will gain medical communication and presentation skills, will have knowledge about Bio informatics with specific reference to cardiology. Candidates will be encouraged to develop skill in organizing workshops, CMEs and conferences. They will be encouraged to attend national cardiology conferences and take part in competitive exams conducted by national and other academic bodies. They will be encouraged to use computer freely for internet access to cardiology journals, take part in cardiology journal club and to utilise Microsoft office tools for powerful presentation. They will be allowed to take part in group discussion and panel discussion to gain confidence and develop skill in discussing cardiology related topics.

Candidates will gain knowledge about organization and management of coronary care unit. They will be encouraged to undertake research activities and will be given proper training in bio statistics and in writing scientific papers.

Affective Skills: Attitude and values

Candidates will learn to work as a team, work as a subordinate as well as a leader as the situations demand

Candidates will learn to treat patient as a whole human being and demonstrate sympathy and humane approach in dealing with patient and relatives.

Candidates will learn to give the appropriate investigations as required ethically and rationally.

Candidates will understand and practice ethical practices in dealing with patients, colleagues, subordinates, superiors and health care workers.
Candidates will learn to take rationale decision in the face of ethical dilemmas in cardiac diseases.

NATIONAL OBJECTIVES

At the end of the course the candidate.

Will be able to work in any hospital in India with minimum of facilities and should be able to diagnose and treat cardiac disease swiftly and efficiently both on an elective and emergency basis.

Will be able to start a Cardiac Unit with effective functioning with minimum inputs.

Will be able to work effectively in National Programmes for the Prevention or Eradication of Heart Diseases.

3.THEORY SYLLABUS:**SYLLABUS/ COURSE CONTENT:**

1. Applied Anatomy: Heart and great vessels, congenital anomalies; development of heart.
2. Applied physiology: Cardiac cycle, cardiac output, pressure and volume loops, cardiac contractility, pulmonary circulation, coronary circulation, blood pressure, cardiac failure, acid base balance. Autonomic control of heart and vasculature, pulmonary function tests and their application to cardiology, interpretation of data on PET.
3. All aspects of normal/Abnormal cardiac Biochemistry
4. Applied Pathology: Congenital heart disease, rheumatic fever and lesions, myocarditis, cardiomyopathies, pericarditis, constrictive pericarditis, infective endocarditis, coronary artery disease including myocardial infarction, hypertensive heart disease, pulmonary embolism, cardiac tumors.
5. Applied pharmacology: cardiac glycosides, anti-hypertensives, diuretics, drugs for coronary artery, betablockers, calcium channel blockers, inotropic

agents, antibiotics, antiarrhythmic agents, metabolic modulators, antiarrhythmics, recent advances in pharmacology pertaining to cardiology.

6. Cardiac Microbiology including cardiac molecular biology, relevant aspects of Rheumatic fever, infective endocarditis.
7. Cardiovascular Imaging: Chest x-ray, ECG, Echo, Nuclear medicine imaging, MRI, CT scan, PET scan.
8. Hemodynamics and interventions: Cardiac catheterization, oxymetry, hemodynamics, angiogram, interventional procedures in cardiology practice.
9. Clinical Cardiology: General Evaluation of Coronary artery disease, Rheumatic heart disease, Congenital heart disease and other paediatric cardiac disorders, Cardiac arrhythmias, Heart failure, Peripheral vascular disorders, pulmonary thromboembolism and pulmonary hypertension. Systemic hypertension, Systemic diseases involving heart, Heart muscle diseases, pericardial diseases, Traumatic heart disease, Tropical cardiac conditions, Tumors of heart, Genetics, molecular biology and immunology related to cardiology, Geriatric heart disease, General anaesthesia and non cardiac surgery in patients with heart disease, pregnancy and heart disease, Epidemiology and preventive cardiology.

Bioethics

1. Respect human life and the dignity of every individual.
2. Refrain from supporting or committing crimes against humanity and condemn all such acts.
3. Treat the sick and injured with competence and compassion and without prejudice and apply the knowledge and skills when needed.
4. Protect the privacy and confidentiality of those for whom we care and breach that confidence only when keeping it would seriously threaten their health and safety or that of others.
5. Work freely with colleagues to discover, develop, and promote advances in medicine and public health that ameliorate suffering and contribute to human well being.
6. Educate the public about present and future threats to the health of humanity.
7. Advocate for social, economic, educational and political changes that ameliorate suffering and contribute to human well being.
8. Teach and mentor those who follow us, for they are the future of our caring profession.

4. CLINICAL TRAINING:

The Students will be clinically trained in parent department during the 3 years course.

- Cardiac surgery -1 month
- Nuclear Cardiology- 1 month
- Pediatric Cardiology- 1 month
- Coronary care unit- 6 months
- Cardiac imaging like CT, PCT, MRI- 1 month
- Electrocardiology like EPS, CRT-15 days

Candidates will manage patients with acute coronary syndromes and assist in primary angioplasties.

During II year, students are encouraged to undergo special postings for learning new advanced techniques / Procedure / Skills in institutions of higher repute where the requisite facilities are available without affecting the duties of the parent department.

5.SKILL TRAINING:

NON-INVASIVE TECHNIQUES

To perform and interpret various non invasive techniques including:

1. Electrocardiography.
2. Radiology- routine and spealized areas like CT and MRI.
3. Stress testing- tread mill test, stress related and other nuclear techniques.
4. Holter monitoring for arrhythmias and ischaemic disorders.
5. Head up tilt test.
6. Echocardiography- M mode, Two Dimensional, Doppler, Colour flow imaging, Transoesophageal Echocardiography and Echo directed Haemodynamic studies.
7. Pace maker follow up and interpretation of Pacemaker ECGs and trouble shooting.
8. Interpretation of results of nuclear cardiac imaging, CT angiograms and cardiac MRI.

INVASIVE CARDIOLOGY

1. Experience in cardiac catheterization to calculate and interpret various haemodynamic parameters.
2. Right and left heart cath and coronary angiography procedure in adults and children.
3. To perform temporary pacemaker insertion.
4. To assist in various intervention including valvuloplasty, permanent pacemaker implantation, Angioplasty, device implantation and interventions in congenital heart disease.
5. Electrophysiology: To interpret electrophysiology data and assist in electrophysiology procedure, permanent pacemaker implantation.

Biomedical aspects

To understand the functional principles of various biomedical equipments used for the invasive and non invasive cardiology.

EXPERIENCE TO BE GAINED:

1. Echocardiography- Transthoracic 1000 cases.
2. Transesophageal echocardiography- 25 cases.
3. Temporary pacing- 20 cases.
4. Diagnostic coronary angiography- 50 cases.
5. Right heart catheterization – 10 cases.

6. Number of Holter ECGs analysed- 50 cases.
7. Number of permanent pacemaker assisted- 5 cases.
8. Number of angioplasty assisted.10 cases

6.TEACHING METHODOLOGY:

- Ward/ OPD patient management.
- Long and short topic presentations.
- Clinicocardiological and clinicopathological conferences.
- Inter-departmental Periodical meeting on relevant topics with Department of Anatomy, Physiology, Bio-chemistry and Microbiology.
- Journal club.
- Research review.
- Problem solving sessions.
- Guest and in-house lectures, Conference, seminars and CME's.
- Participation in workshops, etc.
- Teaching undergraduates/ postgraduates/ paramedical staff.
- Weekly medical audit (patient care review meeting).
- Biomedical equipments use and maintenance.

7.RESEARCH WORK:

The candidate will be trained in the ability to

- Frame a research question.
- Plan a study to answer the question.
- Collect the relevant information and
- Evaluate appropriately the collected data to draw a conclusion.

The candidate should become conversant with the reporting of these results as a research paper, in journals and as a presentation in conferences.

The students will be encouraged to do oral/poster presentation in International conference.

Students should compulsorily attend Research Methodology workshop conducted by the University within first six months of D.M.Course.

8.LOG BOOK:

MAINTENANCE OF HAND WRITTEN LOG BOOK

- a) Every Post-graduate candidate shall maintain a record of skills he/she has acquired during the training period certified by the various Heads of Departments where he/she has undergone training including outside the Institution.

- b) When the candidates are sent for external posting the Log Book should be certified for that particular period by the concerned Head of the Department. At the end of the course, the candidate should summarise the contents and get the hand written log book certified by the head of the departments.
- c) The candidate should also be required to participate in the teaching and training programme of Post-graduate and intern students.
- d) In addition the heads of departments shall involve their post graduate candidates in seminars, journal clubs, group discussions and participation in clinical, clinico pathological conferences, training in medical audit, health information system.
- e) Certified Hand written log books should be submitted at the time of practical examination for the scrutiny of the board of examiners.
- f) The hand written log book should contain journal club detail, clinical case presentations, procedures assisted and done independently and papers published.

The Post Graduate student of a Post Graduate Degree Course in Super specialties shall maintain Log Book of the work carried out by them and training including details of surgical operations assisted or done independently.

The Log Book shall be checked and assessed by the faculty members imparting the training.

Periodical evaluation of Log Book to be done by the Head of the Department as per 52nd SAB.

The Evaluation of the candidates in both theory and practical aspects will help the candidate in the improvement of his/her knowledge skills & attitude.

9.COMPETENCY ASSESSMENT:

Overall:

1. Communication / Commitment / Contribution /

Compassion towards patients and Innovation	-	10 Marks
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2. Implementation of Newly learnt techniques	-	10 Marks
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3. Documentation of case sheets / discharge Summary / Review	-	10 Marks
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4. Number of cases presented in Clinical Meetings/ Journal

Clubs / Seminars / Papers presented in Conference	-	10 Marks
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5. No. Of Medals/ Certificates won in the conference / Quiz

competitions and other academic meetings with details.	-	10 Marks
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Total	----- 50 Marks -----
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- Assessment I - February - First year
 II - August - First year
 III - February - Second Year
 IV - August - Second year
 V - February - Third Year
 VI - May - Third Year

VIVA INCLUDING COMPETENCY ASSESSMENT – 100 Marks (50+50)

10. THEORY EXAMINATION:

Paper I	Basic sciences
Paper II	Clinical Cardiology
Paper III	Haemodynamics, Therapeutics and Interventions
Paper IV	Recent Advances

Each paper will contain:

1. Essay questions (2)	-	2 X 15 = 30 Marks
2. Short Notes (10)	-	10 X 7 = 70 Marks
Total		100 Marks

11. CLINICAL EXAMINATION:

Particulars	Time for candidate to examine the cases	Time examiners for question to the candidates	Maximum Marks
Long Case	1 Case x 60 Minutes	60 Minutes	100
Short Case	2 Cases x 15 Minutes	30 Minutes	100
Ward Rounds	3 Patients x 10 Minutes	30 Minutes	100
OSCE	5 Stations x 3 Minutes	15 Minutes	50
Viva Voce		15 Minutes	100
Log Book			50
Total			500

As per Medical council of India Post Graduate Medical Education Regulations 2000 (amended upto 10th August 2016)clause 13.9 A Postgraduate student of a Postgraduate degree Course in broad specialities / Super Specialities would be required to present one poster presentation ,to read one paper at a National /State conference and to present one Research paper which should be published /accepted for

publication /sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the Postgraduate Degree Examination.

Apart from Poster/Oral paper presentation in National/State conferences, the Research paper published by the candidate in the University Journal of Medical Sciences will be considered as equivalent to the Research Paper as mentioned in 13.9. clause. Case Reports can also be published in University Journal of Medical Sciences but case reports will not be considered as Research Paper.

The candidate can also present Research Paper as per Clause 13.9 of Post Graduate Education Regulation 2000, and if the article sent for publication by the candidate as primary author or corresponding author which has not yet been published/accepted for publication, the candidate should submit a letter from the HOD, stating that the article sent for publication is of publishable merit and the proof of the Research Article submitted to the Journal for publication should be sent to the university forwarded through the HOD [as per 53rd SAB]

The student can submit articles for the University journal anytime from the time of registration in the University till 6 months prior to theory examination.

12.OSCE:5 Stations

- 1.Electrocardiography
- 2.Echocardiography
3. Angiocardiography
- 4.CT/MRI/PET
5. Complex cardiac patient

13.RECOMMENDED BOOKS:

1. Perloff's Clinical Recognition of Congenital Heart Disease, 6th Edition.
2. Essentials of Cardiac Physical Diagnosis; Jonathan Abrams.
3. Bedside Approach in the Diagnosis of Congenital Heart Disease. Author: Rajendra Tandon.
4. The Echo Manual ; Jae K. Oh. 3rd edition.
5. Physical diagnosis pages of 4th edition Hurst text book "THE HEART"
6. Textbook of Clinical Echocardiography; Catherine M Otto. 5th edition.
7. Feigenbaum's Echocardiography; Armstrong. 7th edition.
8. ASE's Comprehensive Echocardiography;Roberto Lang.2nd Edition.
9. Braunwald's Heart Disease: A Textbook of Cardiovascular Medicine, 2-Volume Set, 10th Edition; Douglas L. Mann MD.
10. Hurst's the Heart, 14th Edition: Two Volume Set 14th Edition; Valentin Fuster.
11. Marriott's Practical Electrocardiography; by Galen S. Wagner- 12th edition.

12. Leoschamroth: An Introduction to Electro Cardiography; Calambur Narasimhan. 8th adapted edition.
13. Clinical Electrocardiography: A Textbook- 4th Edition. Antoni Bayes de Luna.
14. Clinical Arrhythmology 1st Edition; Antoni Bayes de Luna.
15. The 12 Lead ECG in ST Elevation Myocardial Infarction: A Practical Approach for Clinicians 1st Edition; Antoni Bayes de Luna.
16. Grossman & Baim's Cardiac Catheterization, Angiography, and Intervention; Mauro Moscucci; 8th edition.
17. Interventional Cardiology 1st Edition - Spencer B. King III.
18. Transradial Access: Techniques for Diagnostic Angiography and Percutaneous Intervention 1st Edition; Howard A. Cohen.
19. Cardiac Catheterization Handbook, 6th Edition; Morton J. Kern.
20. Practical Handbook of Advanced Interventional Cardiology: Tips and Tricks; Thach Nguyen and Dayi Hu – 4th edition.
21. Interventions in Structural, Valvular and Congenital Heart Disease, Second Edition; Horst Sievert (Editor), Shakeel A. Qureshi.
22. Cardiovascular Therapeutics - A Companion to Braunwald's Heart Disease, 4th Edition; Elliott M. Antman.
23. Cardiovascular Physiology: Mosby Physiology Monograph Series, 10th edition (Mosby's Physiology Monograph) Achilles J. Pappano PhD.
24. Netter's Cardiology (Netter Clinical Science); Runge. 2nd edition.
25. Josephson's Clinical Cardiac Electrophysiology; 5th edition. Mark E. Josephson.
26. Clinical chemistry in Diagnosis and Treatment 3rd Edition; Joan F Zilva.
27. Cardiovascular Physiology; Robert M. Berne. 8th edition.
28. Paediatric Cardiology, 3rd Edition; Robert H. Anderson.
29. Moss & Adams' Heart Disease in Infants, Children, and Adolescents, Including the Fetus and Young Adult ; 9th edition.
30. TextBook of Structural Interventions from Pediatrics to Geriatrics-
Dr.I.B.Vijayalakshmi

****Note:** The editions are as applicable and the latest editions shall be the part of the syllabi.

14. JOURNALS:

1. Indian Heart Journal
2. Journal of American College of Cardiology
3. Circulation
4. European Heart Journal
5. Circulation Research
6. American Heart Journal
7. JACC: Cardiac Interventions

8. Heart
9. New England Journal Of Medicine
10. International Journal of cardiology
11. American Journal of Cardiology
12. JACC: Heart failure
13. Journal of Thoracic and cardiovascular Surgery
14. PACE
15. EuroPACE

D.M. - VIROLOGY

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI
Syllabus - D.M VIROLOGY

1. AIM:

- The discipline of virology has evolved from the initial description of a virus as 'contagium vivum fluidum' in the 19th century, to the concept of the virome in the 21st century. The field is a fascinating and rapidly evolving branch of medicine with immense relevance to humanity and modern medicine.
- Viral diseases are an important contributor to morbidity and mortality instrumental in increasing infectious disease burden in the country, but are often under diagnosed and hence go undetected. Many of the new, emerging and re-emerging pathogens are viruses. Despite the felt need, services for viral diagnosis are still rudimentary at state level colleges in the country, owing to lack of both infrastructure and trained professionals in the discipline. Only a few tertiary care hospitals in the country have the set up of a clinical virology laboratory. There is strong emphasis on building capacity for viral diagnosis and research, with the Indian Council of Medical Research setting up a multi-tier network of virology laboratories across the country. This D.M. programme in virology will also help in enhancing specialized human resources for this activity.
- Much of the progress in virology has been technology and expertise driven, and huge strides were made in the discipline with the advent of cell culture, monoclonal antibodies by hybridoma technology and, finally, nucleic acid-based tests. These have truly changed the face of medical virology, particularly in medicine. It is essential to take this discipline ahead in India, with a super-speciality program in this field.

2. OBJECTIVES

The primary objective of the program is to produce a cadre of specialized medical virologists who would help establish clinical diagnostic services in various hospitals/centres in the country and provide training and knowledge dissemination in this super-speciality.

The secondary objectives of the program are manifold. The candidate is expected to acquire adequate understanding of processes involved in the pre-analytical, analytical and post-analytical phases of the clinical diagnostic laboratory testing for viral infections, as detailed below. At the end of the course, the candidate is expected to be able to:

- Know about sample collection, transportation, processing and storage in an appropriate manner
- Understand the basic principles of viral assays/techniques
- Perform the necessary assays /techniques independently
- Interpret results of assays/techniques, and their clinical significance
- Troubleshoot all problems related to the assays/techniques, after proper root cause analysis
- Discuss results with treating clinicians and advise further investigations

- Assure quality of the assays/techniques concerned
- Plan, write and implement research projects in virology, analyze their results and publish these in peer-reviewed journals
- Advise concerned agencies regarding viral diseases and their outbreaks

3. **THEORY SYLLABUS (INCLUDING BIO-ETHICS):**

a. *SUBJECT SPECIFIC THEORETICAL COMPETENCIES*

Cognitive domain (Knowledge domain)

At the end of the course the student should be able to understand and describe the following, in the context of the medically important viruses listed in the syllabus below:

1. The morphology and genomic organization of the virus
2. The epidemiology of the viral infection
3. The clinical presentation of the viral illness
4. The immunopathogenesis of the infection
5. The laboratory diagnosis of the virus, including conventional and molecular approaches.
6. Prophylaxis, management and treatment of infection

b.Syllabus

A. General Virology

- Principles of viral structure
- Viral taxonomy
- Replication of DNA and RNA viruses
- Innate responses to viral infections
- Adaptive immune response to viral agents
- Pathogenesis of viral infections
- Viral evolution
- Epidemiology of viral infections
- Bacteriophages
- Antiviral agents - mechanisms of action, PK/PD, clinical indications
- Antiviral resistance testing
- Immunization against viral diseases
- Diagnostic virology
- Bio safety, Bio Security & Containment Modalities

B. Systemic Virology

B.1. DNA viruses

Poxviridae - Variola, Vaccinia, Molluscum contagiosum etc.

Herpesviridae – HSV-1 and -2, HCMV, VZV, EBV etc.

Adenoviridae

Papillomaviridae

Polyomaviridae – JC, BK etc.

Parvoviridae - Parvovirus B19,

Hepadnaviridae - HBV

B.2. RNA viruses

Picornaviridae - Enterovirus (Poliovirus, Coxsackievirus etc.), Rhinovirus

Orthomyxoviridae - Influenza

Paramyxoviridae – Parainfluenza, Measles, Mumps, RSV, HPMV etc.

Reoviridae - Rotavirus etc.

Caliciviridae - Norovirus, Sapovirus etc.

Astroviridae

Coronaviridae – including SARSCoV, MERS CoV etc.

Rhabdoviridae – Rabies, Chandipura virus etc.

Flaviviridae - DENV, JE virus, KFD, Zika etc.

Togaviridae - Chikungunya virus, Rubella virus

Bunyaviridae - CCHF, Hanta etc.

Arenaviridae

Filoviridae - Marburg, Ebola virus etc.

Retroviridae - HIV, HTLV 1&2

C. Clinical virology

Viral infections of the skin - including pediatric exanthems and enanthems

Viral respiratory infections - rhinitis, pharyngitis, croup, bronchiolitis, pneumonia etc.

Viral CNS infections - encephalitis, meningitis, acute flaccid paralysis, etc.

Viral gastroenteritis - viruses causing diarrhoea

Viral hepatitis – e.g., due to HAV, HBV, HCV, HDV, HEV etc.

Viral infections in the immunocompromised – e.g., in transplant recipients

Congenital viral infections – e.g., due to HCMV, rubella, VZV, HIV etc.

Sexually transmitted viral infections

Ocular viral infections

Oncogenic viral infections

HIV/AIDS

Prion diseases

D. Viral epidemiology

Viral outbreak preparedness, investigation, prevention and control

Emerging and re-emerging viruses

Conventional and molecular epidemiology of viral infections

Biosafety, containment and biosecurity for viruses (including standard precautions, use for personal protective equipment, hospital infection control and biomedical waste management)

Vectors of viral diseases and their control

E. Viral immunology

Immune responses to viral infections

Immunopathogenesis of viral diseases

Viral vaccines and vectors

F. Virological methods

Techniques for viral diagnosis (as listed under the psychomotor domain)

Principles of calibration and preventive maintenance of vital equipments
(Biomedical Engineering)

G. Research methodology

As a part of the common training of all post-graduate

c. Affective domain (attitudes including communication and professionalism)

At the end of the course, the candidate should be able to understand and apply the principles and practices pertaining to the following issues:

- Human ethics (including confidentiality, written informed consent, etc.)
- Animal ethics
- Counselling (pre- and post-test)
- Communication with patients and clinicians
- Professionalism and integrity

4. CLINICAL TRAINING:

During this period the candidates would spend the mornings in the concerned wards and the afternoons in the virology laboratory (processing and following up the clinical samples collected/ received). In the wards, they should assist in ward rounds with senior colleagues in these specialities, attend calls/consultations and participate in the bedside clinical teaching sessions related to cases with suspected viral infections.

a. Laboratory Posting for duration of two years.

1. Medicine (3 months)
2. Pediatrics (especially for congenital infections, viral respiratory infections and gastroenteritis, exanthems, etc.) (3 months)
3. Neurology (2 weeks to 1 month)
4. Transplant Medicine/ Nephrology (for opportunistic viral infections) (2 weeks to 1 month)
5. Oncology/ Haematology (for opportunistic viral infections) (2 weeks to 1 month)
6. Gastroenterology (especially for viral hepatitis) (2 weeks to 1 month)

7. HIV facilities: Counselling, ICTC, PPTCT and ART clinic (2 weeks)
8. Ophthalmology (ocular viral infections) (2 weeks)
9. Dermatology (2 weeks)
10. Community Medicine (2 weeks) with field visits with regard to suspected viral out breaks.

In addition to the above, during the course, the following learning activities should be completed during the two years (3 modules of 6 months each / year)

1. Core curriculum of research methodology, biostatistics, ethics and principles of epidemiology (1 month)
2. Viral diagnostic techniques
 - a. Viral serology: 2 months
 - b. Viral culture and identification (including cell culture): 2 months
 - c. Molecular diagnostic tests in virology: 2 months
 - d. Pathology posting: Histopathology of viral infections: 1 month

b. External postings (arrangements must be formalized by the institution):

II Year POSTINGS:

1. National Institute of Virology/ ICMR Virology Network Laboratory: 1 month
2. Any Indian Veterinary Research Institute (IVRI): 1 month
3. Any viral vaccine manufacturing facility (e.g., Central Research Institute, Kasauli; Pasteur Institute, Conoor; Serum Institute, Pune; etc.): 1 month
4. Any other academic institution with a functional diagnostic virology facility (including molecular virology/ viral culture): 1 month (for learning techniques not available in the parent department)

During II year, students are encouraged to undergo special postings for learning new advanced techniques / Procedure / Skills in institutions of higher repute where the requisite facilities are available without affecting the duties of the parent department.

5. SKILL TRAINING REQUIREMENTS

Psychomotor domain

1. Virological techniques: At the end of the course the student should be able to perform independently, interpret, validate, provide troubleshooting and assure quality, for the following practical techniques:
 - Isolation of viruses - Cell (tissue) culture;
 - Embryonated hen's egg inoculation (various routes)
 - Animal inoculation
 - Staining and microscopy for viral inclusion bodies
 - Electron microscopy
 - Immunofluorescence

- Enzyme immunoassay/ ELISA
- Immunochromatographic tests (ICT) and other point-of-care (PoC) tests
- Immunoblotting/ Western blot assay
- Hemagglutination and haemadsorption
- Conventional serological assays (optional): Complement fixation test (CFT), hemagglutination inhibition, etc.
- Neutralization assay
- Nucleic acid extraction
- Nucleic acid amplification techniques (target amplification, e.g., PCR, real-time PCR, signal amplification etc)
- Amplicon detection techniques – Gel electrophoresis, hybridization, etc.
- Nucleic acid sequencing and sequence analysis
- Bio informatics and Proteomics

Teaching skills/ Pedagogy:

At the end of the course, the candidate should be able to teach and train undergraduates, post-graduates and technical staff, the theoretical and practical aspects of clinical virology

6. TEACHING METHODOLOGY:

- a) Journal Club: 1 hour duration - Paper presentation/discussion - once per week.
- b) Seminar: One seminar every week of one hour duration (Afternoon)
- c) Lecture/discussion: Lectures on newer topics by faculty, in place of seminar as per need.
- d) Case presentation: Presentation of clinical cases/ case scenarios of viral infection. Residents will present a clinical case for discussion before a faculty and discussion made pertaining to its laboratory infection and management.
- e) Combined Round/Grand Round: These exercises are to be done for the hospital once every 2-3 months involving presentation of unusual or difficult cases of viral infections. Presentation of cases in clinical combined / grand rounds and clinical series/ research data for the benefit of all clinicians and other related disciplines
- f) Practical (laboratory bench-side) learning-teaching activities: During the laboratory postings, this will be ongoing, where the candidate will learn from senior colleagues and peers, as well as teach virology to the microbiology post-graduate students
- g) Microbiology undergraduate and post-graduate teaching programmes: The candidates will participate in conducting these programmes (theory classes and practical exercises)
- h) CMEs/Workshops: The candidates should attend at least 2 of these during their course.

7. RESEARCH WORK:

The candidate is introduced to the field of research in Virology, and is trained in research methodology, both at laboratory and clinical level.

The candidate will be trained in the ability to

- Frame a research question.
- Plan a study to answer the question.
- Execute the study
- Collect the relevant information from the study and
- Evaluate appropriately the collected data to draw a conclusion.

The candidate should become conversant with the reporting of these results as a research paper, in journals and as a presentation in conferences.

The activities would consist of:

Planning and organizing relevant studies to be submitted as a Research paper at the end of the course.

Students should compulsorily attend Research Methodology workshop conducted by the University within first six months of D. M Course.

8. LOG BOOK:

Postgraduate students shall maintain a log book of the work carried out by them and the training programme undergone during the period of training including details of laboratory exercises, ward rounds, case presentation and work done independently by the D.M. candidates. The log book shall be checked and assessed periodically by the faculty members imparting the training, including the clinical and external postings (described below).

The resident is required to work full time in the virology section/ department, and participate in the patient care-related and academic and research activities as described below.

The orientation during the first year at the institution would include participation in the undergraduate teaching programmes, during all activities pertaining to virology. The candidate should also participate in all postgraduate (M.D. Microbiology) academic activities pertaining to virology throughout their tenure. These may be arranged in collaboration with another local institution running these courses with MCI approval if they are not available within the same institution.

The Post Graduate student of a Post Graduate Degree Course in Super specialties shall maintain Log Book of the work carried out by them and training including

details of surgical operations assisted or done independently.

The Log Book shall be checked and assessed by the faculty members imparting the training.

Periodical evaluation of Log Book to be done by the Head of the Department as per 52nd SAB.

The Evaluation of the candidates in both theory and practical aspects will help the candidate in the improvement of his/her knowledge skills & attitude.

9. COMPETENCY ASSESSMENT:

Overall:

1. Communication / Commitment / Contribution / Compassion towards patients and Innovation	-	10 Marks
2. Implementation of Newly learnt techniques	-	10 Marks
3. Documentation of case sheets / discharge Summary / Review	-	10 Marks
4. Number of cases presented in Clinical Meetings/ Journal Clubs / Seminars / Papers presented in Conference.	-	10 Marks
5. No. Of Medals/ Certificates won in the conference / Quiz competitions and other academic meetings with details.	-	10 Marks
Total		50 Marks

Assessment	I	- February	-	First Year
	II	- August	-	First Year
	III	- February	-	Second Year
	IV	- August	-	Second Year
	V	- February	-	Third Year
	VI	- May	-	Third Year

VIVA INCLUDING COMPETENCY ASSESSMENT – 100 Marks (50+50)

10. THEORY EXAMINATION

Paper I : Basic Sciences & Research Methodology

Paper II : Diagnostic Virology

Paper III : Clinical Virology

Paper IV : Recent advances in clinical virology

Each paper will contain:

I Essay	2 x 15 = 30 marks
II Short notes	10 x 7 = 70 marks

Total 100 marks

11. CLINICAL EXAMINATION:

Particulars	Time for candidate to examine the cases	Time examiners question candidates	for to the	Maximum Marks
Long Case	1 Case X 60 minutes	60 Minutes		100
Short Case	2 Cases X 15 Minutes	30 Minutes		100
Ward Rounds	3 Patients X 10 Minutes	30 Minutes		100
OSCE	5 stations X 3 Minutes	15 Minutes		50
Viva Voce		15 Minutes		100
Log Book/Portfolio				50
Total Marks				500

As per Medical Council of India Post Graduate Medical Education Regulations 2000 (amended upto 10th August 2016) clause 13.9 A Postgraduate student of a Postgraduate degree Course in broad specialties/ Super Specialties would be required to present one poster presentation to read one paper at a National/State conference and to present one Research paper which should be published/accepted for publication/sent for publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate Degree Examination.

Apart from Poster/Oral paper presentation in National/State conferences, the Research paper published by the candidate in the University Journal of Medical Sciences will be considered as equivalent to the Research Paper as mentioned in 13.9. clause. Case Reports can also be published in University Journal of Medical Sciences but case reports will not be considered as Research Paper.

The candidate can also present Research Paper as per Clause 13.9 of Post Graduate Education Regulation 2000, and if the article sent for publication by the candidate as primary author [as per 53rd SAB] or corresponding author which has not yet been published/accepted for publication, the candidate should submit a letter from the HOD, stating that the article sent for publication is of publishable merit and the proof of the Research Article submitted to the Journal for publication should be sent to the university forwarded through the HOD [as per 53rd SAB]

The student can submit articles for the University journal anytime from the time of registration till 6 months prior to theory examination.

12. OSCE: (5 stations)

1. Tissue culture for viruses
2. Serology for detection of viruses
3. Molecular techniques for virus detection

4. Sequencing and characterization of viruses
5. Bioinformatics and viral genetics
6. Clinical verology – Clinical Spoters, Observe response, Infection control, ICU set up for ID case.

13. REFERENCE BOOKS:

- Reviews of Medical Microbiology (Jawetz)
- Lennette's Laboratory Diagnosis of Viral Infections
- Clinical Virology Manual (ASM)
- Medical Virology (White and Fenner)
- Mandell, Douglas and Bennett's Principles and Practice of Infectious Diseases
- Field's Virology
- Topley and Wilson (Virology) and Harrison's Text book of Medicine

****Note:** The editions are as applicable and the latest editions shall be the part of the syllabi.

14. JOURNALS:

Journals- J Clin Microbiol, J Clin Virol, J Med Virol, Diag Microbiol Infect Dis, J Virol Methods, Clin Microbiol Rev, Emerg Infect Dis, IJMR, IJMM, Indian J Virol. Lancet Journal on Infectious diseases. Journal of infectious diseases.

D.M. - PULMONARY MEDICINE

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI
Syllabus - D.M - PULMONARY MEDICINE

1. AIMS:

The Aim of medical education for the award of DM (Pulmonary Medicine) shall be to produce competent specialists and/or Medical teachers in the field of Pulmonary Medicine

- 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;
- ii. Who shall have mastered the competencies, pertaining to Pulmonary Medicine 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 discipline concerned;
- iv. Who shall have acquired a spirit of scientific inquiry and is oriented to the principles of research and epidemiology; and
- v. Who shall have acquired the basic skills in teaching of the medical and paramedical professionals.

Specific AIMS:

As a result of the training under this program, at the end of 3 years of postgraduate training, a resident must acquire the following knowledge, skills and competencies:

1. A thorough knowledge of pathological abnormalities, clinical manifestations, and principles of management of a large variety of medical conditions affecting respiratory system.
2. Skill and competence to choose and interpret correctly the results of the various routine investigations necessary for proper management of the patient. While ordering these investigations, a resident must be able to understand the sensitivity, specificity and the predictive value of the proposed investigation, as well as its cost-effectiveness in the management of the patient.

3. Skill and competence in interventions like endotracheal intubation, needle lung biopsy, bronchoscopy, needle thoracocentesis, Intercostal drain placement, pericardiocentesis, thoracoscopy, and various endobronchial procedures.
4. Skills and competence to perform commonly used diagnostic procedures, namely, pleural aspiration, pleural biopsy, lung biopsy, allergy testing, fine needle aspiration, polysomnography, ultrasonography and cardiopulmonary exercise testing.
5. Skill and competence to choose and interpret correctly the results of specialized investigations including radiologic, ultra-sonographic, biochemical, hemodynamic, electrocardio graphic, electrophysiological, pulmonary functional, haematological, immunological, nuclear isotope scanning, arterial blood gas analysis results, polysomnographic and bronchoscopic results.
6. Skill and competence to provide consultation to other medical and surgical specialties and sub-specialties, whenever needed.
7. Skill and competence to function effectively in varied clinical settings, namely emergency/critical care, ambulatory care, out-patient clinic, in-patient wards.
8. Skill and competence to take sound decisions regarding hospitalization, or timely referral to other consultants of various medical sub specialties recognizing his limitations in knowledge and skills in these areas.
9. 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.
10. Skill and competence to advise on the preventive, restorative and rehabilitative aspects including those in the elderly, so as to be able to counsel the patient correctly after recovery from an acute or chronic illness.
11. Skill and competence to understand research methodology in Pulmonary 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.

12. Skill and competence to work cohesively in Resuscitation team along with paramedical personnel and maintain discipline and healthy interaction with the colleagues.

13. Skill and competence to communicate clearly and consciously, and teach other junior residents, medical students, nurses and other paramedical staff, the theory as well as the practical clinical skills required for the practice of Pulmonary Medicine.

2. OBJECTIVES:

End of the training the candidate should be able to act as a consultant in pulmonary and critical care.

1. He/She should be able to diagnose and manage independently:

i. Tuberculosis

ii. Non-tuberculous lung diseases

iii. Common medical and systemic lung diseases esp. those involving the respiratory system

iv. Pulmonary problems of specialized nature related to industry, environment, high altitudes, aviation, under water conditions and drowning.

2. In critical care, he/she should be able to:

i. Resuscitate the critically ill and provide entire spectrum of respiratory support starting from oxygen therapy to ECMO.

ii. Diagnose and manage independently medical emergencies especially those involving the respiratory system.

iii. Provide assisted respiratory support in the hospital and on long term basis including home ventilation.

3. Of practical procedures, he/she should be able to perform:

i. Various bedside procedures required in medical management of patients.

ii. Specialized procedures for diagnosis and management of lung diseases such as fiberoptic bronchoendoscopy, bronchography, lung and pleural biopsies, thoracocentesis and thoracostomy, thoracoscopy and interventional procedure in the airway and pleural cavity.

iii. Comprehensive lung function studies including Spirometry, diffusion-studies, airway resistance and compliance, body plethysmography and blood gas analysis and cardiopulmonary exercise testing.

iv. Allergy and bronchoprovocation tests

- v. Interpretation of polysomnography
- 4. He/she should be able to interpret other laboratory tests such as:
 - i. Radiographic and scanning images and perform intervention radiographic procedures of thorax.
 - ii. Specialized investigations of allied nature such as cardiac catheterization, other organ endoscopies, body scans and angiographic procedures.
 - iii. Histological and cytological specimens of lung diseases
 - iv. Other medical investigations
- 5. He should be able to set up independent pulmonary unit, or in hospitals and medical colleges.
- 6. Skill and competence to provide consultation to other medical and surgical specialties and sub-specialties, whenever needed.
- 7. Skill and competence to function effectively in varied clinical settings, namely emergency/critical care, ambulatory care, out-patient clinic, in-patient wards.
- 8. Skill and competence to advise on the preventive, restorative and rehabilitative aspects including those in the elderly, so as to be able to counsel the patient correctly after recovery from an acute or chronic illness.
- 9. He/She should be able to:
 - i. Carry out and help in conduct of research in pulmonary and medical sciences, communicate the results of such research at medical meetings and report in medical journals.
 - ii. Guide research projects of students and critically evaluate the results of other investigators.

3. THEORY SYLLABUS(INCLUDING BIO-ETHICS):

Each DM student is required to possess a comprehensive knowledge of the basic and clinical sciences related to pulmonary medicine and critical care, and clinical skills in diagnosing respiratory vis a vis other medical disorders. He/She should have personally performed a sufficient number of both invasive and non-invasive procedures for diagnosis and treatment such as bronchoendoscopic examinations and assisted ventilation; and manage acute respiratory emergencies. He/She should also possess sufficient knowledge and experience in research methodology and development.

I.Theory of Pulmonary Medicine

i. Basic Sciences

A. Anatomy of Respiratory system

1. Anatomy and histology of Respiratory System including airways, pleura, chest wall, lungs and mediastinum
2. Applied Embryology of lungs, mediastinum and diaphragm
3. Developmental anomalies

B. Physiology and Biochemistry

1. Assessment of pulmonary functions
2. Control of ventilation
3. Pulmonary mechanics
4. Ventilation, pulmonary blood flow, gas exchange and gas transport, Respiratory reflexes including cough reflex, lung defence including respiratory surfactant
5. Exercise physiology and testing
6. Non-respiratory functions of lung
7. Inhalation kinetics and its implication in aerosol therapy, sputum induction etc.
8. Acid-base and electrolytic balance
9. Physiology of sleep and their disorders
10. Pathophysiology of respiratory disorders

C. Microbiology

1. Mycobacterium tuberculosis and other mycobacteria
2. Laboratory diagnosis of tuberculosis (including staining, culture and immunological techniques)
3. Virulence and pathogenecity of mycobacteria
4. Bacteria causing respiratory diseases
5. Mycoplasma and respiratory tract infection
6. Anaerobes in pleuropulmonary infections
7. Laboratory diagnosis of nontubercular infections of respiratory tract
8. Respiratory viruses
9. Human Immunodeficiency virus

10. Respiratory fungi: i. Classification of fungal diseases of lung, candidiasis, Actinomycosis, Nocardiosis, Aspergillosis, Blastomycosis etc. ii. Laboratory diagnostic procedures in respiratory mycosis caused by yeast like and Filamentous fungi
11. Opportunistic infections in immunosuppressed host
12. Respiratory parasitic infections

D. Pathology

1. Acute and chronic inflammation
2. Tuberculosis
3. Pneumonias and bronchopulmonary suppuration
4. Chronic bronchitis and emphysema, asthma
5. Occupational lung diseases and pneumoconioses
6. Interstitial Lung Diseases
7. Tumours of the lung, mediastinum and pleura
8. Various mechanisms of hypersensitivity reactions seen in respiratory diseases
9. Diagnostic tests in Allergic diseases of lung – in vitro and in vivo tests, bronchial provocation test
10. Immunology of Tuberculosis

E. Epidemiology

1. Epidemiological terms and their definitions
2. Epidemiological techniques – tuberculin test, surveys
3. Epidemiology of Tuberculosis, pneumoconioses, asthma, COPD and lung cancer
4. National Tuberculosis Control Programme and RNTCP
5. BCG and prevention of TB
6. Research methods and study designs

F. Pharmacology

1. Antimicrobial drugs
2. Antitubercular drugs
3. Antineoplastic drugs
4. Corticosteroids
5. Anti-asthma drugs

6. Drugs used in microbial viral, fungal and parasitic infections
7. Pharmacokinetics and drugs interaction for commonly used drugs in respiratory diseases

ii. Clinical Sciences

A. Infections

a. Tuberculosis

1. Etiopathogenesis
2. Diagnostic methods
3. Differential diagnosis
4. Management of pulmonary tuberculosis including drug resistant TB
5. Complications in Tuberculosis
6. Tuberculosis in children
7. Geriatric tuberculosis
8. Pleural and pericardial effusion and Empyema
9. Mycobacterial other than mycobacterial infections
10. Extrapulmonary tuberculosis
11. HIV and tuberculosis

b. Non-Tuberculous infections of the lungs

- Upper respiratory tract infections
- Approach to the patient with pulmonary infections
- Community Acquired pneumonia
- Nosocomial pneumonias
- Unusual and atypical pneumonias including bacterial, viral, fungal and parasitic rickellsial
- Bronchiectasis and lung abscess
- Acquired immunodeficiency syndrome and opportunistic infections in immuno-compromised host
- Bronchitis and bronchiolitis

B. Non-infectious Lung Diseases

1. Interstitial Lung Disorders

- a. Immune defense mechanisms of the lung
- b. Sarcoidosis
- c. Hypersensitivity pneumonias
- d. Lung involvement in collagen-vascular diseases

- e. Eosinophilic pneumonias and tropical eosinophilia
 - f. Pulmonary vasculitides
 - g. Reactions of the interstitial space to injury
 - h. Pulmonary fibrosis
 - i. Occupational pulmonary diseases
 - j. Interstitial diseases of other aetiologies
 - k. Drug induced pulmonary diseases
 - l. Aspiration and inhalational (non-occupational) diseases of the lung
2. Pulmonary Circulatory disorders
- Pulmonary edema
 - Pulmonary Hypertension and cor pulmonale
 - Pulmonary Thromboembolic Diseases
 - Cardiac problems in Pulmonary patient and pulmonary diseases produced by cardiac diseases
3. Obstructive Diseases of the Lungs
- Asthma
 - Chronic obstructive lung disease
 - Pulmonary rehabilitation
4. Cancer of the Lungs
- Epidemiology, pathology, natural history and clinical picture and staging of the carcinoma of lungs and other tumour
 - Approach to diagnosis of pulmonary nodule, cell lungs cancer
 - Medical management and surgical treatment of lung cancer and paraneoplastic syndrome
 - Radiation therapy in the management of the carcinoma of the lungs
 - Paraneoplastic syndromes
5. Diseases of the Mediastinum
- Benign and malignant tumours
 - Non-neoplastic disorders

6. Disorders of the pleura

- Pleural dynamics and effusions
- Non-neoplastic and neoplastic pleural diseases
- Pneumothorax
- Pyothorax and broncho-pleural fistula and its complications

7. Sleep related breathing disorders

8. Obesity hypoventilation disease

9. High altitude

10. Drug induced

11. Disorders of diaphragm

12. Respiratory failure

- Acute Respiratory Distress Syndrome: Pathology, pathogenesis diagnosis and management
- Respiratory failure in the patient with obstructive airway disease
- Respiratory muscle fatigue
- Respiratory and haemodynamic monitoring in acute respiratory failure
- Mechanical ventilation (indications, modes, complications and weaning)
- Principles of critical care

13. Respiratory Care

- Oxygen therapy
- Inhalational therapy
- Bronchial hygiene

C. Surgical aspects of Chest Medicine

- Pre and post-operative evaluation and management of thoracic surgical patient
- Post operative pulmonary complication
- Chest Trauma/trauma related lung dysfunction

D. Investigative/Therapeutic procedures

- Pulmonary function test and its interpretations in determining the disability

- Spirometry, compliance, resistance, lung volume, diffusions
- Bronchoscopy, thoracoscopy and other endoscopic procedures
- Chest Imaging – x-ray chest, ultrasound, CT, Bronchography
- Pulmonary parasitic disease
- Environmental pollution – Indoor/outdoor; Tobacco smoking
- Blood gas analysis
- Cardiopulmonary exercise testing
- Bronchoprovocation tests
- Pulmonary angiography
- ECG and ECHO

E. Research and Clinical Epidemiology

- Research Methodology, study designs (cohort, case control, randomized clinical trials, observational and cross sectional studies)
- Common statistical methods for analysis of research
- Sources of bias

F. Critical Care and Assisted Ventilation

1. Respiratory Failure: Pathogenesis, causes, diagnosis and management
2. Resuscitation of the critically ill including multiple organ failure
3. Cardiopulmonary mechanics
4. Ventilatory principles, application, assessment and monitoring
5. Ventilatory care and support: Nutritional support; Infection control; complications
6. Weaning
7. Comprehensive care of the comatose
8. ICU designing

G. Lung Transplantation :

1. Pretransplantation workup
2. Intraoperative Procedures
3. Post Transplant Care
4. Post Transplantation Complications

5. Post Transplant follow up

H. Paediatric pulmonology

1. Respiratory problems in children
2. Infective pneumonias
3. Childhood tuberculosis
4. Respiratory distress syndrome of the newborn
5. Bronchopulmonary dysplasias
6. Congenital malformations
7. Bronchial asthma
8. Cystic fibrosis
9. Special management problems in children

I. Pulmonary Radiology and Imaging

1. Interpretation of plain radiography, contrast studies, CT scan, M.R.I. and ultrasound examination.
2. Interpretation of ventilation/perfusion scans

J. Respiratory rehabilitation

K. Ethical, legal, economic and other related issues involved in respiratory and critical care

1. Prioritization
2. Withholding and withdrawing mechanical ventilation
3. Legal consent
4. Brain death – certification
5. Palliative care

Bioethics:

1. Respect human life and the dignity of every individual.
2. Refrain from supporting or committing crimes against humanity and condemn all such acts.
3. Treat the sick and injured with competence and compassion and without prejudice and apply the knowledge and skills when needed.

4. Protect the privacy and confidentiality of those for whom we care and breach that confidence only when keeping it would seriously threaten their health and safety or that of others.
5. Work freely with colleagues to discover, develop, and promote advances in medicine and public health that ameliorate suffering and contribute to human well being.
6. Educate the public about present and future threats to the health of humanity.
7. Advocate for social, economic, educational and political changes that ameliorate suffering and contribute to human well being.
8. Teach and mentor those who follow us, for they are the future of our Caring profession.

4. CLINICAL TRAINING:

Duration of Clinical Training Programme – 3 years

YEAR I

Introduction and preliminary posting in the Pulmonary Medicine	6 months
Respiratory Intensive Care Unit	1 month
General Medicine & Allied Specialities	
Paediatric	1 month
Anaesthesiology	1 month
Rheumatology	15 days
Nephrology	15 days
Cardiology	15 days
Gastroenterology	15 days
Neurology	15 days
IMCU	15 days

YEAR II

Pulmonary Medicine	6 months
Intensive Respiratory Care Unit	2 month
Anesthesiology	1 month
Cardiothoracic surgery	1 month
Sleep lab.	1 month
Pulmonary Function Laboratory	1 month

YEAR III

Pulmonary Medicine	6 months
Intensive Respiratory Care Unit	2 month
Interventional Radiology	1 month
Anesthesiology	1 month
Medical Oncology & Radiotherapy	1 month
Lung Transplantation & follow-up	1 month

During II year, students are encouraged to undergo special postings for learning new advanced techniques / Procedure / Skills in institutions of higher repute where the requisite facilities are available without affecting the duties of the parent department.

5. SKILL TRAINING REQUIREMENTS:

I. CLINICAL SKILLS

1. Clinical history taking and examination; ability to analyse different clinical symptoms and signs; interpret their significance and reach a diagnosis
2. Interpretation of laboratory data
3. Interpretation of pulmonary function tests, ECG, ECHO and other investigations
4. Interpretation of chest roentgenography
5. Pulmonary histopathology and cytology
6. Oxygen therapy

7. Nebulization therapy
8. Mechanical ventilation – indications and applications
9. Lung Transplantation medicine : - Recipient selection / Immunosuppression / Post OP follow-up

II. Practical skills

A. Microbiological

1. Sputum smear staining: Gram's AFB staining ; Rapid identification of mycobacterium and culture sensitive
2. Mantoux testing
3. BCG vaccination
4. Skin sensitivity tests

B. Pulmonary Function Tests

1. Spirometry
2. Bronchial provocation tests
3. Body plethysmography
4. Respiratory Sleep monitoring
5. Exercise testing (Cardiopulmonary exercise testing)

III. Diagnostic procedures

1. Fine needle biopsy of lymph nodes, lung and mediastinal masses
2. Biopsy of pleural and lung masses
3. Fiberoptic bronchoendoscopic examination and related procedures including bronchial and transbronchial lung biopsy, bronchoalveolar lavage and fine needle aspiration (At least 50 procedures)
4. Medical thoracoscopy
5. Endobronchial ultrasound
6. Rigid bronchoscopy and related procedures

IV. Therapeutic

1. Aspiration of pleural and pericardial effusion
2. Tube thoracostomy
3. Respiratory muscle exercising
4. Medical Emergency management
 - i. Cardiopulmonary resuscitation
 - ii. Management of acute emergencies
 - . Acute respiratory failure
 - . Acute asthma

- . Pneumothorax
- . Haemoptysis
- . Pulmonary thromboembolism
- . Multiple organ failure
- 5. Mechanical Ventilation: On hand training in providing both short and long term mechanical ventilatory support
 - i. Invasive
 - . Endotracheal intubation
 - . Ventilatory settings
 - . Care and maintenance
 - . Monitoring – Invasive & Non Invasive
 - . Weaning
 - ii. Non-invasive ventilation including domiciliary respiratory support
 - iii. Newer modes of ventilation
 - iv. Home ventilation
- 6. ECMO – Extracorporeal membrane oxygenation
 - . Indication
 - . Management of vv ECMO
- 7. Endobronchial procedures
 - . Electrocautery of airway lesions
 - . Deobstruction
 - . Balloon bronchoplasty
 - . Stenting

E. Managerial Skills

- a. Policies/procedures (NHS, Hospital, Departmental)
- b. Staff management (planning, recruitment, appraisal)
- c. Equipment (choosing to ordering, medical physics)
- d. Resource management/clinical budgeting
- e. Contracting/ setting standards, quality monitoring
- f. Information technology/Health informatics
- g. Clinical governance/audit, risk management
- h. Compliments/complaints
- i. Medico-legal statements
- j. Committee Work

- k. Liaising with other agencies (e.g. police, coroner)
- l. Public Relations/media
- m. Major Incident planning/exercises

F. Teaching Skills

- a. Lecture preparation
- b. Small Group techniques
- c. Presentation techniques
- d. Teaching critique
- e. Departmental teaching programme
- f. Professional Development (self-directed learning)
- g. Teaching certificate expected

G. Professional Attributes

- a. Leadership
- b. Reliability
- c. Teamwork
- d. Self-motivation (prioritisation, project completion)

6. TEACHING METHODOLOGY:

It consists of outpatient and inpatient bedside discussions, ward rounds and case demonstrations, journal clubs, seminars and symposia, clinical meetings and joint conferences with other departments. An average program is given below:

- a. Joint program with other departments
 - i. Students' clinicopathological conferences (CPC) 1 per week
 - ii. Students' clinical meeting 1 per week
 - iii. Staff CPC 1 per week
 - iv. Staff clinical meeting 1 per week
 - v. Death review meeting 1 per week
 - vi. Radiology round 1 per week
 - vii. Pulmonary Histocytopathology round Once in 2 weeks
- b. Departmental
 - viii. Teaching rounds 2 per week

ix. DM Journal Club	1 per week
x. DM Seminar (Basic Sciences)	1 per week
xi. DM bedside	1 per week

7. RESEARCH WORK:

The candidate is introduced to the field of research in Pulmonary Medicine (including Tuberculosis) both at clinical and laboratory level.

The candidate will be trained in the ability to

- Frame a research question.
- Plan a study to answer the question.
- Collect the relevant information and
- Evaluate appropriately the collected data to draw a conclusion.

The candidate should become conversant with the reporting of these results as a research paper, in journals and as a presentation in conferences.

The activities would consist of:

Planning and organizing relevant studies to be submitted as a Research paper at the end of the course.

Students should compulsorily attend Research Methodology workshop conducted by the University within first six months of DM Course.

8. LOG BOOK:

The Postgraduate student of a Postgraduate Degree Course in Super specialties shall maintain Log Book of the work carried out by them and the training programme undergone during the period of training including details of surgical operations assisted or done independently.

The Log Book shall be checked and assessed by the faculty members imparting the training.

Periodical evaluation of Log Book to be done by the Head of the Department as per 52nd SAB.

The Evaluation of the candidates in both theory and practical aspects will help the candidate in the improvement of his/her knowledge skills & attitude.

9. COMPETENCY ASSESSMENT:

Overall:

1. Communication / Commitment / Contribution /		
Compassion towards patients and Innovation	-	10 Marks
2. Implementation of Newly learnt techniques	-	10 Marks
3. Documentation of case sheets / discharge		
Summary / Review	-	10 Marks
4. Number of cases presented in Clinical Meetings/		
Journal Clubs / Seminars / Papers presented in		
Conference.	-	10 Marks
5. No. Of Medals/ Certificates won in the conference		
/ Quiz competitions and other academic meetings		
with details.	-	10 Marks

	Total	50 Marks

Assessment	I	February	-	First Year
	II	August	-	First Year
	III	February	-	Second Year
	IV	August	-	Second Year
	V	February	-	Third Year
	VI	May	-	Third Year

VIVA INCLUDING COMPETENCY ASSESSMENT – 100 Marks (50+50)

10. THEORY EXAMINATION:

Paper I - Basic Sciences applied to Pulmonary Medicine and Critical Care

Paper II - Tuberculosis (Pulmonary & Extra Pulmonary)

Paper III - Non tuberculosis Pulmonary diseases including allied Specialities

Paper IV - Recent advances applied to Pulmonary Medicine and Critical Care

Each paper will contain:

I Essay 2 x 15=30 Marks

II Short notes 10 x 7 =70 Marks

Total 100 Marks

11. CLINICAL EXAMINATION :

Particulars	Time for candidate to examine the cases	Time for examiners to question the candidates	Maximum Marks
Long Case	1 Case X 60 minutes	60 Minutes	100
Short Case	2 Cases X 15 Minutes	30 Minutes	100
Ward Rounds	3 Patients X 10 Minutes	30 Minutes	100
OSCE	5 stations X 3 Minutes	15 Minutes	50
Viva Voce		15 Minutes	100
Log Book			50
Total			500

As per Medical Council of India Post Graduate Medical Education Regulations 2000 (amended upto 10th August 2016) clause 13.9 A Postgraduate student of a Postgraduate degree Course in broad specialties/ Super Specialties would be required to present one poster presentation to read one paper at a National/State conference and to present one Research paper which should be published/accepted for publication/sent for publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate Degree Examination.

Apart from Poster/Oral paper presentation in National/State conferences, the Research paper published by the candidate in the University Journal of Medical Sciences will be considered as equivalent to the Research Paper as mentioned in 13.9. clause. Case Reports can also be published in University Journal of Medical Sciences but case reports will not be considered as Research Paper.

The candidate can also present Research Paper as per Clause 13.9 of Post Graduate Education Regulation 2000, and if the article sent for publication by the candidate as primary author or corresponding author which has not yet been published/accepted for publication, the candidate should submit a letter from the HOD, stating that the article sent for publication is of publishable merit and the proof of the Research Article submitted to the Journal for publication should be sent to the university forwarded through the HOD [as per 53rd SAB]

The student can submit articles for the University journal anytime from the time of registration till 6 months prior to theory examination.

12. OSCE (5 Stations):

1. Microscope-slides / culture specimens
2. Interpretation of charts/Graphs
3. Gross Pathology specimens
4. Instruments
5. Radiology-X-ray / CT-chest

13. REFERENCE BOOKS:

RECOMMENDED LIST OF BOOKS FOR TUBERCULOSIS

1. Tuberculosis – Surendra k. Sharma
2. Toman's Tuberculosis
3. Tuberculosis & Nontuberculous Mycobacterial Infections -David Schlossberg
4. TB Handbook- WHO
5. Tuberculosis: A Comprehensive Clinical Reference by Schaaf et al
6. Tuberculosis Of The Skeletal System by Tuli Sm
7. Clinical Tuberculosis, Fifth Edition by Peter D.O. Davies and Stephen B Gordon
8. Clinical Tuberculosis: A Practical Handbook by Peter D.O. Davies and Ajit Lalvani
9. Tuberculosis 2003, by William N. Rom and Stuart M. Garay
10. A Clinician's Guide To Tuberculosis, 2000, by Iseman

RECOMMENDED LIST OF BOOKS:

Text books for Pulmonary medicine

1. Fishman's Pulmonary Diseases and Disorders – 2 volume, McGraw Hill, Fifth Edition.
2. Murray and Nadel – Textbook of respiratory medicine – 2 volume, Saunders.
3. Crofton & Douglas – Respiratory Diseases – 2 volume Blackwell.
4. Gibson – Textbook of Respiratory Medicine – Lippincott.
5. Synopsis of Diseases of the Chest – Fraser & Spiro, Elsevier
6. Nunn's applied respiratory physiology, Andrew B. Lumb
7. Egan's Fundamentals of Respiratory Care. Lippincott.
8. Respiratory Physiology JB West – LANGE McGraw Hill.
9. Harrison's – Principles of Internal Medicine – Fauci et al. McGraw Hill.
10. Clinical respiratory Medicine – Albert & Spiro- Elsevier Mosby.

Textbooks for airways disorders

1. Chronic Obstructive Pulmonary Disease: A Systemic Inflammatory Disease by Hiroyuki Nakamura and Kazutetsu Aoshima
2. Chronic Obstructive Pulmonary Disease: Co-Morbidities and Systemic Consequences by Linda Nici and Richard ZuWallack
3. Asthma and COPD: Basic Mechanisms and Clinical Management by Peter J. Barnes DM FRS FMedSci and Jeffrey M. Drazen
4. Pharmacology and Therapeutics of Asthma and COPD by Clive P. Page and Peter J. Barnes
5. New Drugs and Targets for Asthma and COPD (Progress in Respiratory Research)
6. COPD: A Guide to Diagnosis and Clinical Management (Respiratory Medicine) 2010 by Nicola A. Hanania and Amir Sharafkhaneh

Text book for Sleep disorders

1. Principles and Practice of Sleep Medicine, 5th Edition by Meir H. Kryger MD. FRCPC (Author), Thomas Roth PhD (Author), William C. Dement MD PhD (Author)

Textbook for Pulmonary Vascular disorders

1. Diagnosis and Management of Pulmonary Hypertension (Respiratory Medicine) 2015 by James R. Klinger and Robert P. Frantz
2. Pulmonary Hypertension: Basic Science to Clinical Medicine, 2015 by Bradley A. Maron and Roham Zamanian
3. Pulmonary Hypertension, 2011 by Voelkel, Norbert, F

Textbook for Lung malignancies

1. Abelloff's Clinical Oncology, 2013 by John E. Niederhuber MD and James O. Armitage MD
2. DeVita, Hellman, and Rosenberg's Cancer, Principles and Practice of Oncology: Review Fourth Edition, by Ramaswamy Govindan MD (Editor), Daniel Morgensztern (Editor)
3. Pulmonary Involvement in Patients with Hematological Malignancies, 2011 by Elie Azoulay
4. Tumors and Tumor-like Conditions of the Lung and Pleura: Expert Consult: 2010, by Cesar A. Moran MD and Saul Suster MD

Textbook for Interstitial lung diseases

1. Interstitial Lung Disease 2017 by Harold R. Collard
2. Interstitial Lung Disease 6 March 2003 by Marvin Schwarz and Talmadge King Jr. MD
3. Diffuse Lung Diseases: Clinical Features, Pathology, HRCT 2011 by R. Polverosi and M. Zompatori

Textbook for clinical examination

1. Chamberlain's Symptom and sign in clinical medicine-Ogilvie.
2. Macleods – Clinical Examination- Churchill Livingstone.
3. Hutchison's Clinical Methods: An Integrated Approach to Clinical Practice 23rd Edition

Textbook for Pleural disorders

1. Pleural Diseases by Light. Lippincott.

Textbook of Allergy and Clinical Immunology

1. Allergens and Allergen Immunotherapy, Fourth by Richard F. Lockey and F. Lockey Richard
2. Clinical Allergy, Immunology and Transplant 2014 by C. G. Weber M.D.
3. Roitt's Essential Immunology (Essentials) January 2017 by Peter J. Delves and Seamus J. Martin
4. Allergy 2011 by Holgate

Critical care:

1. Paul Marino – The ICU book – Lippincott.
2. Chang – Clinical Applications of Mechanical Ventilation. 3rd Edition Thomson.
3. George and Light – Essentials of Pulmonary and Critical Care Medicine – Lippincott, Williams & Wilkins.
4. Principles And Practice Of Mechanical Ventilation 2012 by Martin J. Tobin

5.Non–Invasive Respiratory Support Techniques: Oxygen Therapy, Non–Invasive Ventilation and CPAPby Glenda Esmond and Christine Mikelsons

Textbook for Interventional Procedures

- 1.Bronchoscopy and Central Airway Disorders, 2012,by Henri Colt and SeptimiuMurg
- 2.Atlas of Flexible Bronchoscopy, 2011by Pallav Shah
- 3.Flexible Bronchoscopy,2012,by Ko-Pen Wang and Atul C. Mehta
- 4.Introduction to Bronchoscopy , 2009,by Armin Ernst
- 5.Interventional Bronchoscopy: A Clinical Guide ,2013,byAtul Mehta and Prasoon Jain

RADIOLOGY:

- 1.Thoracic imaging – Webb & Higgins Lippincott.
- 2.Diagnostic Thoracic imaging – Miller, McGraw Hill.
- 3.Principles of Chest X-ray Diagnosis – Simon.JayPee Bros.
- 4.Imaging of diseases of the chest David M. Hamsell
- 5.Felson's Principle of chest Roentgenology
6. Fraser &Pare's Diagnosis of the Diseases of the Chest – Elsevier.
- 7.High-Resolution CT of the Lung ,2014, by W.Richard Webb (Author), Nestor L. Muller (Author), David P. Naidich (Author)
- 8.Imaging of Pulmonary Infections: A Fundamental and Clinical Text by Nestor Luiz Muller and Tomas Franquet

SURGERY:

- 1.Surgery of the chest -Gibbson
2. Procedures in respiratory medicine- Warren m gold
- 3.General Thoracic Surgery- TW Shields

****Note:** The editions are as applicable and the latest editions shall be the part of the syllabi.

14. JOURNALS:

RECOMMENDED LIST OF JOURNALS FOR TUBERCULOSIS :

1. Indian Journal of Tuberculosis
2. International Journal of Tuberculosis and Lung Disease (IJTLD)
- 3.RNTCP guidelines- TB India
- 4.Tubercle
- 5.Tuberculosis
- 6.Journal of Tuberculosis researc
- 7.British journal of Tuberculosis

Recommended List of Journals

1. Lung India
2. Indian Journal of Chest diseases and allied sciences
3. Current opinion in pulmonary medicine
4. Thorax
5. International Journal of TB and Lung Diseases
6. Chest
7. American Journal of Respiratory and Critical care medicine
8. European Respiratory journal
9. European Respiratory review
10. The Lancet Respiratory Medicine
11. Journals of Indian medical association
12. New England Journal of Medicine
13. Journal of association of physicians of India
14. Clinics in chest medicine
15. American journal of roentgenology
16. Cancer
17. Cancer research
18. Journal of thoracic and cardiovascular surgery
19. Respiration
20. Journal of Clinical Oncology
21. International journal of Oncology
22. Journal of Bronchology & Interventional Pulmonology

D.M. - INFECTIOUS DISEASE

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI

Syllabus – D.M - INFECTIOUS DISEASE

1. AIMS:

The Infectious Disease Training is a three-year program designed to train future faculty in academic infectious diseases. The programme provides rigorous training and supervised experience with a faculty of broad clinical and research expertise at a sufficient level for the resident to acquire outstanding skills as a specialist in infectious diseases.

2. OBJECTIVES:

The program provides a unified experience that allows trainees to develop excellence in the competencies specified by the MCI as they apply to the super-speciality of Infectious Diseases.

2.1 Patient Care

Exposure to the entire range of cases in infectious disease including regularly encountered inpatient and outpatient infections and the special situations including HIV/AIDS, Transplant, Hematology-Oncology infections, immunocompromized hosts, illnesses of travelers, hospital acquired infections , sexually transmitted infections, and the epidemiology of infectious diseases. The trainees will learn to gather data; order diagnostic tests; interpret data, especially those provided by the Microbiology Laboratory; make diagnostic and therapeutic decisions; perform procedures; manage patient therapies emphasizing the appropriate use of antimicrobial agents; and work with others to provide patient-focused care.

2.2 Medical Knowledge

Through direct patient care in a variety of settings, conferences, lectures, and appropriate use of the medical literature, the trainee will master the broad range of problems in infectious disease as they relate to the individual patient and to the larger community. The trainees will have appropriately supervised primary responsibility for applying their knowledge to the solution of problems in differential diagnosis and complex management. They will learn to manage challenges unique

to Infectious Disease including the feedback, in terms of antimicrobial resistance, from the individual patient to the environment; the actual loss of useful antimicrobial agents; and the recognition of new diseases.

2.3. Practice-Based Learning and Improvement

The trainees will become expert in the use of the current medical literature to support evidence based decision-making. Through rounds and conferences they will learn to appraise the medical literature critically. With faculty supervision, they will hone their clinical skills.

2.4 Interpersonal and Communication Skills

Thorough experience in the inpatient and outpatient settings, the trainees will learn and practice communication skills appropriate to the medical consultant. In their clinics, they will practice the development of an ongoing therapeutic relationship with highly complex patients. With appropriate supervision, they will serve as the primary caregivers for patients with HIV/AIDS and other chronic infectious disease problems. In this setting they will coordinate the care of professionals in a variety of specialties. They will practice the skills necessary to obtain a difficult history and when required, the delivery of bad news.

2.5. Professionalism

The trainees will be expected to practice professionalism in all academic and clinical venues. With appropriate supervision, they will have primary responsibility for staffing clinics and for providing support and care for a panel of seriously ill patients. They will deal with patients of many ages and ethnicities and with varying degrees of impairment. Intellectual integrity is emphasized in all settings, including the clinic, the conference room, and the laboratory.

2.6 Systems-Based Practice

In all settings, but particularly in the HIV/AIDS and General Infectious Disease Clinics, the trainees coordinate interdisciplinary care by a range of specialists, including all of the medical specialties but strongly emphasizing social services, physical therapy, economics, transportation, and psychological support.

2.7 Research

The trainees gain the basic skills and knowledge to function as an independent

investigator. The trainees are exposed to state-of-the-art basic, translational, and clinical research and through active participation develops a firm basis for continuing success in one or more of these areas. Skills include developing appropriate scientific knowledge and critical evaluation of the relevant literature, problem solving in the design and interpretation of experiments, communication of progress and results in formal and informal settings, understanding national and international systems for funding research and obtaining their own funding, and sharpening critical thinking. Scientific professionalism will be stressed in each venue.

3. THEORY SYLLABUS:

During the training programme, the resident will have formal instruction, clinical experience or other opportunities to gain expertise in the etiology, pathogenesis, epidemiology, clinical presentation, diagnosis, differential diagnosis, management and prevention of the following disorders pertaining to various pathogens and organ systems. A detailed log of at least 100 patients with different infectious diseases should be maintained. The curriculum will include a study of all infectious diseases—bacterial, mycobacterial, viral, spirochetal, rickettsial etc occurring in adults and in the pediatric age group. The trainee or resident must also have a practical knowledge of infections encountered in oncology, surgery, obstetrics/ gynaecology, post-transplant patients, and in other specialties. Emphasis will be given to national health programmes for control and prevention of infectious diseases (*e.g., Revised National Tuberculosis Control Programme, National AIDS Control Programme, UIP etc.*) wherever applicable.

The programs educational objectives will be attained through extensive experience in the following areas: inpatient consultations on adults (*and children*), outpatient clinics and consultations, clinical microbiology, virology and Parasitology laboratory rotations, conferences, seminars and didactic courses, infection control meetings, antibiotic surveillance subcommittee meetings, biostatistics and research methodology coursework, research projects and teaching responsibilities.

3.1: Content

I: BASIC PRINCIPLES IN THE DIAGNOSIS AND MANAGEMENT OF INFECTIOUS DISEASES

A: Microbial Virulence factors

- Molecular Perspective of Microbial Pathogenicity
- Microbial Adherence
- Toxins

B: Host Defense Mechanism

- Innate (General or Nonspecific) Host Defense Mechanisms
- Human Genetics and Infection
- Antibodies
- Complement
- Granulocytic Phagocytes
- Cell–Mediated Defense against Infection
- Nutrition, Immunity and Infection
- Evaluation of the Patient with Suspected Immunodeficiency

C: Epidemiology of Infectious Disease

- Epidemiologic Principles
- One Health concept
- Emerging and Reemerging Infectious Disease Threats
- Hospital Preparedness for Emerging and Highly Contagious Infectious Diseases

D: Clinical Microbiology

- The Clinician and the Microbiology Laboratory

E: Anti – Infective Therapy

- Principles of Anti–infective Therapy
- Molecular Mechanisms of Antibiotic Resistance in Bacteria
- Pharmacokinetics and Pharmacodynamics of Anti–Infective Agents
- Penicillin's
- Cephalosporin's
- Other β – lactam Antibiotics
- Beta – Lactam Allergy
- Fusidic Acid
- Aminoglycosides
- Tetracyclines and Chloramphenicol
- Rifamycins
- Metronidazole

- Macrolides, Clindamycin and Ketolides
- Glycopeptides (*Vancomycin and Teicoplanin*), Streptogramins (*Quinupristin – Dalfopristin*), and Lipopeptides (*Daptomycin*)
- Polymyxins (*Polymyxin B and Colistin*)
- Oxazolidinones
- Sulfonamides and Trimethoprim
- Quinolones
- Urinary Tract Agents: Nitrofurantoin and Methenamine
- Tropical Antibacterials
- Antimycobacterial Agents
- Systemic Antifungal Agents
- Antiviral Drugs (Other than Antiretrovirals)
- Immunomodulators
- Hyperbaric Oxygen
- Agents Active against Parasites
- Complementary and Alternative Medicines for Infectious Diseases
- Antimicrobial Management: Cost and Resistance
- Interpreting the Results of Clinical Trials on Antimicrobial Agents
- Outpatient Parenteral Antimicrobial Therapy
- Understanding the profile of antibiotics in terms of generations.
- Newer antibiotics FDA/Non FDA approval of drugs -significance.

II: MAJOR CLINICAL SYNDROMES

A: Fever

- Temperature Regulation and the Pathogenesis of Fever
- Fever of Unknown Origin
- The Acutely ill patient with Fever and Rash
- Acute undifferentiated febrile illnesses

B: Upper Respiratory Tract Infections

- The Common Cold
- Pharyngitis
- Acute Laryngitis
- Acute Laryngotracheobronchitis (*Croup*)
- Otitis Externa, Otitis Media and Mastoiditis
- Sinusitis
- Epiglottitis
- Infections of the Oral Cavity, Neck and Head

C: Pleuropulmonary and Bronchial Infections

- Acute Bronchitis
- Chronic Obstructive Pulmonary Diseases, Chronic Bronchitis and Acute Exacerbations

- Bronchiolitis
- Acute Pneumonia
- Pleural Effusion and Empyema
- Lung Abscess
- Chronic Pneumonia
- Cystic Fibrosis

D: Urinary Tract Infection

E: Sepsis, severe sepsis and septic shock

F: Intra – abdominal Infections

- Peritonitis and Intraperitoneal Abscesses
- Infections of the Liver and Biliary System
- Pancreatic Infections
- Splenic Abscess
- Appendicitis
- Diverticulitis and Typhilitis

G: Cardiovascular Infections

- Endocarditis and Intravascular Infections
- Infections of Prosthetic Valves and Other Cardiovascular Devices
- Prophylaxis of Infective Endocarditis
- Mediastinitis

H: Central Nervous System Infections

- Approach to the Patient with Central Nervous System Infection
- Acute Meningitis
- Cerebrospinal Fluid Shunt Infections
- Chronic Meningitis
- Encephalitis, Myelitis and Neuritis
- Brain Abscess
- Subdural Empyema, Epidural Abscess and Suppurative Intracranial Thrombophlebitis

I: Skin and Soft Tissue Infections

- Cellulitis and Subcutaneous Tissue Infections
- Myositis
- Lymphadenitis and Lymphangitis

J: Gastrointestinal Infections and Food Poisoning

- Principles and Syndromes of Enteric Infection
- Esophagitis

- Nausea, Vomiting and Noninflammatory Diarrhea
- Antibiotic – Associates Colitis
- Inflammatory Enteritides
- Enteric Fever and Other Causes of Abdominal Symptoms with fever
- Foodborne Diseases
- Tropical Sprue / Enteropathy
- Whipple's Disease

K: Bone and Joint Infections

- Infectious Arthritis of Native Joints
- Osteomyelitis
- Infections Arthritis of Native Joints

L: Diseases of the Reproductive Organs and Sexually Transmitted Diseases

- Genital Skin and Mucous Membrane Lesions
- Urethritis
- Vulvovaginitis and Cervicitis
- Infections of the Female Pelvis
- Prostatitis, Epididymitis and Orchitis

M: Eye Infections

- Microbial Conjunctivitis
- Microbial Keratitis
- Endophthalmitis
- Infectious Causes of Uveitis
- Periocular Infections

N: Hepatitis

- Acute Viral Hepatitis
- Chronic Viral Hepatitis

O: Acquired Immunodeficiency Syndrome

- Epidemiology and prevention of Acquired Immunodeficiency Syndrome and Human Immunodeficiency Virus Infection
- Diagnosis of Human Immunodeficiency Virus Infection
- The Immunology of Human Immunodeficiency Virus Infection
- General Clinical Manifestations of Human Immunodeficiency Virus Infection (*Including the Acute Retroviral Syndromes and Oral, Cutaneous, Renal, Ocular and Cardiac Diseases*)
- Pulmonary Manifestations of Human Immunodeficiency Virus Infection
- Gastrointestinal and Hepatobiliary Manifestations of Human Immunodeficiency Virus Infection

- Neurologic Diseases Caused by Human Immunodeficiency Virus – I and Opportunistic Infections
- Malignancies in Human Immunodeficiency Virus Infection
- Human Immunodeficiency Virus Infection in Women
- Paediatric Human Immunodeficiency Virus Infection
- Antiretroviral Therapy for Human Immunodeficiency Virus Infection
- Management of Opportunistic Infections Associated with Human Immunodeficiency Virus Infected
- Vaccines for Human Immunodeficiency Virus – I Infection

III: INFECTIONS DISEASES AND THEIR ETIOLOGIC AGENTS

A: Viral Diseases

- Introduction to Viruses and Viral Diseases

DNA Viruses

Poxviridae

- Orthopoxviruses: Vaccinia (*Smallpox Vaccine*), Variola (*Smallpox*), Monkeypox and Cowpox.
- Other Poxviruses that infect humans; Parapox viruses, Molluscum Contagiosum and Tanapox.

Herpesviridae

- Introduction to Herpesviridae
- Herpes Simplex Virus
- Varicella – Zoster Virus
- Cytomegalovirus
- Epstein – Barr Virus (*Infectious Mononucleosis*)
- Human Herpesvirus Types 6 & 7
- Kaposi's Sarcoma – Associated Herpes Virus (*Human Herpesvirus Type 8*)
- Herpes B Virus

Adenoviridae

- Adenovirus

Papovaviridae

- Papillomaviruses
- JC, BK and other Polyomaviruses; Progressive Multifocal Leukoencephalopathy.

Hepadnaviridae

- Hepatitis B Virus and Hepatitis Delta Virus

Parvoviridae

- Parvovirus

RNA Viruses

Reoviridae

- Orthoreoviruses and Orbiviruses
- Coltiviruses and Seadornaviruses (*Colorado Tick Fever*)
- Rotaviruses

Togaviridae

- Alphaviruses
- Rubella Virus (*German Measles*)

Flaviviruses

- Flaviviruses (*Yellow Fever, Dengue Hemorrhagic Fever, Japanese Encephalitis, West Nile Encephalitis, St. Louis Encephalitis, Tick – Borne Encephalitis*)
- Hepatitis C
- Hepatitis G Virus and TT virus

Coronaviridae

- Coronaviruses, Including Severe Acute Respiratory Syndrome (SARS) – Associated Coronavirus

Paramyxoviridae

- Parainfluenza Viruses
- Mumps Virus
- Respiratory Syncytial Virus
- Human Metapneumovirus
- Measles Virus (*Rubeola*)
- Zoonotic Paramyxoviruses; Hendra, Nipah and Menangle Viruses

Rhabdoviridae

- Vesicular Stomatitis Virus and Related Viruses
- Rhabdoviruses

Filoviridae

- Marburg and Ebola Virus Hemorrhagic Fevers

Orthomyxoviridae

- Influenza Virus

Bunyaviridae

- California Encephalitis, Hantavirus Pulmonary Syndrome and Bunyavirid Hemorrhagic Fevers

Arenaviridae

- Lymphocytic Choriomeningitis Virus, Lassa Virus and the South American Hemorrhagic Fevers

Retroviridae

- Human T – Cell Lymphotropic Virus Types I & II
- Human Immunodeficiency Viruses

Picornaviridae

- Introduction to the Enteroviruses
- Poliovirus
- Coxsackieviruses, Echoviruses and Newer Enteroviruses
- Hepatitis A Virus
- Rhinovirus

Calciviridae and other Gastrointestinal Viruses

- Noroviruses and other Calciviruses
- Astroviruses and Picobirnaviruses

Unclassified Viruses

- Hepatitis E Virus

B: Prion Diseases

- Prions and Prion Diseases of the Central Nervous System (*Transmissible Neurodegenerative Diseases*)

C: Chlamydial Diseases

- Introduction to Chlamydial Diseases
- *Chlamydia trachomatis* (*Trachoma, Perinatal Infections, Lymphogranuloma Venereum and other Genital Infections*)
- *Chlamydophila (Chlamydia) psittaci* (*Psittacosis*)
- *Chlamydophila (Chlamydia) Pneumoniae*

D: Mycoplasma Diseases

- Introduction to *Mycoplasma* Diseases
- *Mycoplasma Pneumoniae* and Atypical Pneumonia
- Genital Mycoplasmas: *Mycoplasma genitalium*, *Mycoplasma hominis*, and *Ureaplasma* Species

E: Rickettsioses and Ehrlichioses

- Introduction to Rickettsioses and Ehrlichioses
- *Rickettsia rickettsii* and other spotted fever group Rickettsiae (*Rocky Mountain Spotted Fever* and other Spotted Fever)
- *Rickettsia akari* (*Rickettsialpox*)
- *Coxiella Burnetii* (*Q Fever*)
- *Rickettsia Prowazekii* (*Epidemic or Louse – Borne Typhus*)
- *Rickettsia typhi* (*Murine Typhus*)
- Scrub Typhus
- *Ehrlichia Chaffeensis* (*Human Monocytic Ehrlichiosis*), *Anaplasma phagocytophilum* (*Human Granulocytotropic Anaplasmosis*), and other Ehrlichiae.

F: Bacterial Diseases

- Introduction to Bacteria and Bacterial Diseases

Gram – Positive Cocci

- *Staphylococcus aureus* (Including *Staphylococcal Toxic Shock*)
- *Staphylococcus epidermidis* and other Coagulase – Negative Staphylococci
- Classification of Streptococci
- *Streptococcus pyogenes*
- Nonsuppurative Poststreptococcal Sequelae: Rheumatic Fever and Glomerulonephritis
- *Streptococcus Pneumoniae*
- Enterococcus Species, *Streptococcus bovis* and *Leuconostoc* Species
- *Streptococcus agalactiae* (*Group B Streptococcus*)
- Viridans Streptococci, *Group C* and *G* Streptococci, and *Gemella morbillorum*.
- *Streptococcus anginosus* Group

Gram – Positive Bacilli

- *Corynebacterium diphtheriae*
- Other Coryneform Bacteria and *Rhodococcus*
- *Listeria monocytogenes*
- *Bacillus anthracis* (*Anthrax*)
- *Bacillus* species and Related Genera other than *Bacillus anthracis*
- *Erysipelothrix rhusiopathiae*

Gram – Negative Cocci

- *Neisseria meningitidis*
- *Neisseria gonorrhoeae*
- *Moraxella (Branthamella) catarrhalis* and other than Gram – Negative Cocci

Gram – Negative Bacilli

- *Vibrio cholera*

- Other Pathogenic Vibrios
- Campylobacter jejuni and Related Species
- Helicobacter Pylori and other Gastric Helicobacter Species
- Enterobacteriaceae
- Pseudomonas aeruginosa
- Stenotrophomonas maltophilia and Burkholderia cepacia
- Burkholderia pseudomallei and Burkholderia mallei: Melioidosis and Glanders .
- Acinetobacter Species
- Salmonella Species, Including Salmonella typhi
- Shigella Species (*Bacillary Dysentery*)
- Haemophilus Infection
- Brucella Species
- Francisella tularensis (*Tularemia*)
- Pasteurella Species
- Yersinia Species, Including Plague
- Bordetella Species
- Streptobacillus moniliformis (*Rat – Bite Fever*)
- Legionella
- Other Legionella Species
- Capnocytophaga
- Bartonella, including Cat – Scratch Disease
- Calymmatobacterium granulomatis (*Donovanosis Granuloma Inguinale*)
- Other Gram – Negative and Gram – Variable Bacilli

Spirochetes

- Treponema pallidum (*Syphilis*)
- Endemic Treponematoses
- Leptospirosis
- Borrelia Species (Relapsing Fever)
- Borrelia burgdorferi (*Lyme Diseases, Lyme Borreliosis*)
- Spirillum minus (*Rat – bite fever*)

Anaerobic Bacteria

- Anaerobic Infections: General Concepts
- Clostridian tetani (*Tetanus*)
- Clostridium botulinum (*Botulism*)
- Gas Gangrene and other Clostridium – Associated diseases
- Bacteroides, Prevotella, Porphyromonas and Fusobacterium species (and other Medically important Anaerobic Gram – Negative Bacilli)
- Anaerobic Cocci
- Anaerobic Gram – Positive Nonsporulating Bacilli

Mycobacterial Diseases

- Mycobacterium tuberculosis

- *Mycobacterium leprae* (Leprosy, Hansen's Disease)
- *Mycobacterium avium* Complex
- Infections caused by Non – Tuberculosis Mycobacteria

Higher – Bacterial Diseases

- *Nocardia* Species
- Agents of Actinomycosis

G: Mycoses

- Introduction of Mycoses
- *Candida* Species
- Agents of Mucormycosis and Related Species
- *Sporothrix Schenckii*
- Agents of Chromoblastomycosis
- Agents of Mycetoma
- *Cryptococcus neoformans*
- *Histoplasma capsulatum*
- *Blastomyces dermatitidis*
- *Coccidioides* Species
- Dermatophytoses and other Superficial Mycoses
- *Paracoccidioides brasiliensis*
- Uncommon Fungi
- *Pneumocystis* Species

H: Protozoal Disease

- Introduction to Protozoal Diseases
- *Entamoeba histolytica*
- Free – Living Amebas
- *Plasmodium* Species (Malaria)
- *Leishmania* Species: Visceral (kala – azar), Cutaneous and Mucocutaneous Leishmaniasis
- *Trichomonas vaginalis*
- *Babesia* Species
- Cryptosporidiosis (*Cryptosporidium hominis*, *Cryptosporidium parvum* and other species)
- *Cyclospora cayentanensis*, *Isopora belli*, *Sarcocystis* Species, *Balantidium coli* and *Blastocystis hominis*.
- Microsporidiosis

I: Diseases Due to Helminths

- Introduction to Helminth Infection
- Intestinal Nematodes (*Roundworms*)

- Tissue Nematodes, Including Trichinosis, Dracunculiasis, and the Filariases
- Trematodes (*Schistosomes and other Flukes*)
- Cestodes (*Tapeworms*)
- Visceral Larva Migrans and other Unusual Helminth Infections

J: Ectoparasitic Diseases

- Introduction to Ectoparasitic disease
- Lice (*Pediculosis*)
- Scabies
- Myiasis and Tungiasis
- Mites (Including Chiggers)
- Ticks

K: Diseases of Unknown Etiology

- Kawasaki Syndrome

IV: SPECIAL PROBLEMS

A: Nosocomial Infections

- Organization for Infection control
- Isolation
- Disinfection, Sterilization and Control of Hospital Waste
- Infections Caused by Percutaneous Intravascular Devices
- Nosocomial Respiratory Infections
- Nosocomial Urinary Tract Infections
- Nosocomial Hepatitis and other infections transmitted by blood and blood products.
- Human Immunodeficiency Virus in Health Care settings
- Nosocomial Herpesvirus Infections
- Needle stick injury approach

B: Infections in Special Hosts

- *Infections in the Immunocompromised Host: General Principles*
- Infections in patients with Hematologic Malignancies
- Prophylaxis and Empirical Therapy for Infection in Cancer Patients
- Infections in Injection Drug Users
- Risk factors and approaches to Infection in Transplant Recipients
- Infections in Recipients of Hematopoietic Stem Cell Transplantation
- Infection in Solid Organ Transplant Recipients
- Infections in Patients with Spinal Cord Injury
- Infections in the Elderly
- Infections in Asplenic Patients

C: Surgical and Trauma – Related Infections

- Postoperative Infections and Antimicrobial Prophylaxis
- Burns
- Bites

D: Immunizations

- Including adult immunisation and special situations like travel.

E: Zoonoses**F: Travel Medicine**

- Protection of Travelers
- Infections Associated with International travel

G. National guidelines

- Vector borne diseases – National Vector borne Diseases Control Programmes- Malaria, Dengue, Filariasis, Chikungunya, Japanese encephalitis, Kala azar.
- Leprosy
- Polio
- Tropical diseases
- HIV
- TB
- Public Health Act

3.2 Guidelines

Guidelines for patient care clinical experience are as follows:

1. General inpatient infectious diseases consultation service
2. Outpatient infectious diseases clinic
3. Inpatient consultation in oncology, pulmonology, surgery
4. Pediatric infectious diseases rotation.
5. Rotation at a Communicable Diseases Hospital

6. Rotation at a public hospital, where STD elective can be done, if not available on site.
7. Transplant infectious diseases inpatient consultation service wherever possible
8. Exposure to various infectious disease control programmes of Government of India (Revised National Tuberculosis Control Programme, National Vector Borne Disease Control Programme etc.)
9. Rotation through Microbiology
10. ICU rotation to learn Nosocomial Infection.

The main features of these rotations will involve history taking and examination of the patients, sending relevant investigations, reviewing investigation reports and following up with microbiology, formulating a differential diagnosis and a therapeutic plan, discussing the case with the primary consultant and the core faculty for the program, identifying critical questions related to the case, reading of the topic from a standard ID textbook, literature search to retrieve comprehensive review including epidemiology, microbiology, pathology, clinical manifestations, investigative approach, treatment modalities, prognosis and preventive strategies, retrieve practice guidelines (Indian and international), systematic reviews (Cochrane review) if any, review of controversies and identification of research needs.

3.3 Knowledge

1. Knowledge necessary to obtain an orderly history on patients suspected of having an infectious disease.
2. Knowledge necessary to perform a physical examination of patients with infectious problems .
3. Knowledge necessary to describe the typical physical findings and the typical microorganisms .
4. Knowledge to order appropriate tests, to perform portions of test as necessary and to interpret results.
5. Knowledge to recognize a possible need for and requests consultation for

performance or interpretation of procedures.

6. Knowledge for each of the Common Infectious Diseases including tropical infectious diseases to describe the clinical manifestations, etiologic agents and differential diagnosis and to make a differential diagnosis__for each of the Common Presenting Problems.
7. Knowledge to identify the appropriate therapeutic approach and perform therapeutic procedures when appropriate to the patient's condition.
8. Knowledge to recognize need and seek consultation for the performance of therapeutic procedures.
- 9.. Knowledge to identify mechanism of action, indications, contra-indications, dosing schedule, efficacy, cost, side effects, and pharmacokinetics and pharmacodynamics for antimicrobials and biological products including monoclonal antibodies.
10. Knowledge to identify rational combinations of antibiotics_and the therapeutic mechanisms of action.
11. Knowledge to identify clinical situations and methods for measuring appropriate blood and tissue levels of antibiotics.
12. Knowledge to identify accepted clinical situations and drugs of choice for chemoprophylaxis.
13. Knowledge to identify clinical situations and appropriate agents for recommended active and passive immunization: active immunization for infectious diseases.
14. Knowledge to identify important reservoirs and modes of transmission_of infections of public health importance and accepted preventive measures._
15. Knowledge to identify reportable infectious diseases_and proper procedures for reporting them.
16. Knowledge of the basic principles of nosocomial infectious diseases in the various institutional settings, especially catheter-associated urinary tract infections, nosocomial pneumonia, and sepsis associated with intravascular devices, surgical site infections and therapy.
17. Knowledge for the purposes of referral and patient education, to identify

indications, success rates, and common complications of common surgical procedures for infectious disease problems.

3.4 Bioethics:

1. Respect human life and the dignity of every individual
2. Refrain from supporting or committing crimes against humanity and condemn all such acts.
3. Treat the sick and injured with competence and compassion and without prejudice and apply the knowledge and skills when needed.
4. Protect the privacy and confidentiality of those for whom we care and breach that confidence only when keeping it would seriously threaten their health and safety or that of others.
5. Work freely with colleagues to discover, develop, and promote advances in medicine and public health that ameliorate suffering and contribute to human well being.
6. Educate the public about present and future threats to the health of humanity
7. Advocate for social, economic, educational and political changes that ameliorate suffering and contribute to human well being.
8. Teach and mentor those who follow us, for they are the future of our caring profession.

4. CLINICAL TRAINING:

1. Clinical postings in infectious disease wards to obtain competency to take history and perform appropriate physical examination.
2. Development of competency to perform proper investigations, plan appropriate investigations and interpret the investigative results
3. Development of competency in the diagnosis, management and follow up of infectious diseases.
4. The microbiologist be in attendance on a daily ward round taken by the consultant and his residents.

5. Learn ethical practice.

During II year, students are encouraged to undergo special postings for learning new advanced techniques / Procedure / Skills in institutions of higher repute where the requisite facilities are available without affecting the duties of the parent department.

5. SKILL TRAINING REQUIREMENTS:

The following are the skill based training requirements required to be completed by the candidates

5.1 Clinical Microbiology Laboratory:

1. Rotation through various work stations for direct observation and hands-on learning .
2. Rounds in the laboratory trouble-shooting problems and addressing clinical correlation.
3. Reading of textbook sources regarding background information.
4. Directed reading of the primary literature for specific information.
5. Slide lectures addressing specific microscopy topics.

5.2 Hospital Epidemiology:

1. Discussion sessions to review readings and basic concepts in hospital epidemiology.
2. Regular schedule of meetings: Infectious Diseases (ID) Seminar, Infection Control (IC) Staff and Committee meetings, Drug Utilization.
3. Understanding of restricted antibiotic stewardship.
4. Local microbiological resistance.
5. Special project assignments, evaluating new or ongoing problems/nosocomial infections.
6. Outbreak investigation training.

5.3 Infectious Disease Epidemiology

1. Environmental factors in Infectious Diseases.
2. Emerging and re-emerging diseases, Epidemic alert: Notification and reportable disease, Bioterrorism.
3. Control strategies (levels of prevention and modes of intervention, source reduction, vaccination, integrated vector control and diagnosis and treatment)
4. International instruments (International Health Regulations and international disease surveillance)
5. Research in Infectious Diseases.
- a. **Prevention of Hospital acquired Infections (Infection Control)**
 1. Epidemiology and Surveillance
 2. Cluster investigation
 3. Transmission and control of nosocomial infection
 4. Disinfection and sterilization
 5. Isolation system
 6. Regulatory compliance

6. TEACHING METHODOLOGY:

In addition to the clinical and skill based rotation mentioned above, the trainees are required to attend and present at the following formal teaching activities:

1. Infectious Disease lectures
2. Infectious Diseases Case Presentations
3. Infectious Disease Seminars/discussions
4. Journal Club
5. Morbidity and Mortality Conference
6. Electronic/and computer simulators
7. Web based

8. Transplant Conferences (if available)
9. City wide Infectious Diseases Conferences (if available)
10. Internal Medicine Grand Rounds
11. Participation in either a National or International Infectious Diseases Conference.
12. Research and Scholarly Activity

7. RESEARCH WORK:

Each resident is required to conduct research during the training period. The resident will spend time preparing for a research project. Subsequently the resident will be doing his research on a daily basis which will culminate in writing his/her research work. The research work should result in a scholarly publication or a presentation at national/international scientific meetings. Therefore, careful planning and serious execution of the research plan is necessary. This learning objective is achieved by designing and executing a research project under the close supervision of sponsoring faculty and the Research Committee. This objective is further supported by attending local and national research seminars. These activities will supplement the knowledge base of the resident. In addition, it will allow the presenting resident to acquire the necessary skills to deliver an effective presentation.

Students should attend Research Methodology workshop within first six months of D.M Course conducted by the University.

8. LOG BOOK:

Academic achievements of the candidate should be reflected in this portfolio including posters presentation in conferences and workshops attended. The Postgraduate student of a Postgraduate Degree Course in Super specialties shall maintain Log Book of the work carried out by them and the training programme undergone during the period of training including complex cases looked after, seminars, lectures and Journal presentation by the candidate.

The Log Book shall be checked and assessed by the faculty members imparting the training.

Periodical evaluation of Log Book to be done by the Head of the Department as per 52nd SAB.

The Evaluation of the candidates in both theory and practical aspects will help the candidate in the improvement of his/her knowledge skills & attitude.

9. COMPETENCY ASSESSMENT:

Overall:

1. Communication / Commitment / Contribution / Compassion towards patients and Innovation	-	10 Marks
2. Implementation of Newly learnt techniques	-	10 Marks
3. Documentation of case sheets / discharge Summary / Review	-	10 Marks
4. Number of cases presented in Clinical Meetings/ Journal Clubs / Seminars / Papers presented in Conference.	-	10 Marks
5. No. Of Medals/ Certificates won in the conference / Quiz competitions and other academic meetings with <u>Overall</u> details.	-	10 Marks
Total		50 Marks

Assessment	I	- February	-	First Year
	II	- August	-	First Year
	III	- February	-	Second Year
	IV	- August	-	Second Year
	V	- February	-	Third Year
	VI	- May	-	Third Year

VIVA INCLUDING COMPETENCY ASSESSMENT – 100 Marks (50+50)

10. THEORY EXAMINATION:

Paper I - Principles of Infection Control, Antibiotics, Antivirals and Antifungals and its Pharmacokinetics - Pharmacodynamics Antimicrobial Resistance and Antibiotic Stewardship.

Paper II – Tropical Medicine, International Health Regulations, Public Health Act and Vaccines.

Paper III – General Infectious Diseases including HIV

Paper IV – Recent Advances including Transplant Infectious Diseases

Each paper will contain:

1. Essay questions (2)	-	2 X 15	=	30 Marks
2. Short Notes (10)	-	10 X 7	=	70 Marks
Total				----- 100 Marks -----

11. CLINICAL EXAMINATION:

Particulars	Time for candidate to examine the cases	Time for examiners to question the candidates	Maximum Marks
Long Case	1 Case x 60 Minutes	60 Minutes	100
Short Case	2 Cases x 15 Minutes	30 Minutes	100
Ward Rounds	3 Patients x 10 Minutes	30 Minutes	100
OSCE	5 Stations x 3 Minutes	15 Minutes	50
Viva Voce		15 Minutes	100
Log Book			50
			500

VIVA INCLUDING COMPETENCY ASSESSMENT – 100 Marks (50+50)

As per Medical Council of India Post Graduate Medical Education Regulations 2000 (amended upto 10th August 2016) clause **13.9 A Postgraduate student of a Postgraduate degree Course in broad specialties/ Super Specialties would be required to present one poster presentation to read one paper at a National/State conference and to present one Research paper which should be published/accepted for publication/sent for publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate Degree Examination.**

Apart from Poster/Oral paper presentation in National/State conferences, the Research paper published by the candidate in the University Journal of Medical Sciences will be considered as equivalent to the Research Paper as mentioned in 13.9. clause. Case Reports can also be published in University Journal of Medical Sciences but case reports will not be considered as

Research Paper.

The candidate can also present Research Paper as per Clause 13.9 of Post Graduate Education Regulation 2000, and if the article sent for publication by the candidate as primary author or corresponding author which has not yet been published/accepted for publication, the candidate should submit a letter from the HOD, stating that the article sent for publication is of publishable merit and the proof of the Research Article submitted to the Journal for publication should be sent to the university forwarded through the HOD [as per 53rd SAB]

The student can submit articles for the University journal anytime from the time of registration till 6 months prior to theory examination.

12. OSCE:(5 stations)

1. Clinical scenario of General ID/ Tropical Disease
2. Clinical scenario of Transplant/ Immunocompromised patient
3. Clinical scenario of Infection control or Outbreak management
4. Antibiotics/ Disinfectants – Indications and adverse effects
5. Gram stain, Ziehl – Nielsen stain and peripheral Smear

13. REFERENCE BOOKS:

- ***Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases***, 7th ed. G. L. Mandell, J. E. Bennett & R. Dolin, Eds. Churchill Livingstone, 2009.
- ***Text Book of Tuberculosis***, 2nd Edition. Rom WN, Garay SM, eds. Philadelphia, PA: Lippincott Williams & Wilkins, 2004.
- ***Manson's Tropical Diseases***, 22nd Edition. Gordon C. Cook, Alimuddin I. Zumla, eds.
- ***Handbook of Leprosy***. WH Jopling and A C McDougall
- ***Sexually Transmitted Diseases, 4th ed, edited by King K. Holmes P. Frederick Sparling***, Walter E. Stamm, Peter Piot, Judith N. Wasserheit, Lawrence Corey, Myron S. Cohen, et al, New York, NY, McGraw – Hill, 2008.
- ***Tropical Infections Diseases***, 2nd ed, Richard L. Guerrant, David H. Walker, Peter F. Weller, Vol 1 & 2, Churchill Livingstone, 2006
- ***Global HIV / AIDS Medicine***, Edited by Joel Gallant, Paul A. Volberding, Merle A Sande, Joep Lange, Warner C. Greene, Saunders 2008
- ***Fundamentals of Global HIV Medicine***, Editor-in-Chief, Zelalem Temesgen, IHL Press 2009

****Note:** The editions are as applicable and the latest editions shall be the part of the syllabi.

14. JOURNALS:

1. Clinical Infectious Diseases
2. Journals of Infectious Diseases
3. Current Opinion in Infectious Diseases
4. AIDS
5. New England Journal of Medicine
6. Lancet
7. British Medical Journal
8. The National Medical Journal of India
9. Journal of Association of Physicians of India.

D.M. - INTERVENTIONAL RADIOLOGY

THE TAMIL NADU Dr. MGR MEDICAL UNIVERSITY, CHENNAI

Syllabus – D.M Interventional Radiology

The course will be elaborated under the following divisions:

1. Introduction
2. Program Objectives
3. Curriculum
4. Postings
5. Bioethics
6. Research work
7. Log Book
8. Competency Assessment
9. Theory Examination
10. Clinical Examination
11. Suggested books / journals / reading material

I. Introduction:

Interventional Radiology is a relatively young branch of Medicine. With constant improvement of technology, equipment and techniques, the speciality is rapidly growing and replacing a number of established therapeutic options with minimally invasive and less risky treatment options.

At the end of the program, the candidate would possess a comprehensive knowledge of the imaging modalities used in interventional radiology and develop the skills to do both diagnostic and therapeutic interventional procedures. He/she would have personally performed a sufficient number of interventional procedures and be able to diagnose and treat common adult and paediatric pathologies that are amenable to intervention. He/she would also possess sufficient knowledge and experience in research methodology and development.

II. Program objective:

- i) Broad knowledge base – ability to generate a relevant differential diagnosis and plan of treatment, based on an accurate history, physical examination and imaging findings, as well as a good understanding of indications and contraindications for diagnostic and therapeutic procedures.
- ii) Proficiency in diagnosis by multiple imaging modalities
- ii) Ability to think critically
- iii) Skill at performing interventional procedures
- iv) Ability to communicate effectively with patients and referring physicians
- v) Appreciation of humanistic (compassionate, cost conscious, service oriented) and ethical aspects (accountability integrity) of medicine.
- vi) Ability to work as part of a team as Interventional Radiology involves multidisciplinary management.

III. Curriculum:

Aim

The aim of the course is to enable the candidate to become clinically competent and to consistently interpret the results of invasive investigations accurately and reliably. The candidate should also be capable of providing a comprehensive and safe interventional diagnostic and therapeutic service.

Objectives

The trainee requires a sound understanding of the basis of interventional radiology including:

- the embryology, anatomy, normal variants and physiology of the appropriate body system(s)
- the current interventional equipment used including:
 - percutaneous access needles and kits
 - catheters and guidewires
 - dilating devices
 - stents
 - embolisation materials
- specific techniques of access to and therapeutic intervention within various organs and structures
- local, national and where appropriate, international imaging and interventional guidelines

Relevant radiation physics for Interventional Radiology

1. Background Radiation and medical sources of Radiation

Background: Cosmic, Terrestrial, Internal, Radon. Medical Sources: Projection Radiography, Fluoroscopy, Interventional Radiology and Diagnostic Angiography, Digital Subtraction Angiography, and CT.

2. Physics of Angiography equipment: Xray tube, generators, image intensifier, flat panel detector, image magnification, Automatic brightness control, imaging chain, video cameras, artefacts, image processing, Subtraction, road maps and other techniques. Quality assurance in Interventional suite: table top doses, kVp accuracy, timer consistency, mA consistency, focal spot resolution, fluoroscopic beam alignment, safety survey.

3. Radiation units, dose limits and Biological effects

Radiation units: Exposure, Absorbed dose, Effective dose, Collective dose.

Dose Limits: Occupational, Non-occupational Staff, Members of the Public, Fetus, Patient- Adult, Child, Pregnancy and radiation, DRLs and “Trigger” Levels - Local and national.

Interactions of x-rays with matter, Deterministic effects and stochastic effects with examples.

4. Personnel and patient Dosimetry

Radiation Detectors – TLD, GaFchromic, transmission ion chamber, ionization chamber, survey meter, Gieger Muller counter.

Personnel Dosimetry: TLD badge, TLD regulations, Pocket dosimeter; dose map in the interventional suite.

Patient Dosimetry: Dose area product, cumulative KERMA, skin doses, interpretation of doses.

5. Factors Affecting Patient Dose: Fluoroscopy and Interventional Radiology- beam angulations, SID, Exposure factors, preset factors, dose settings, low dose protocols etc.

6. Principles of Radiation Protection: Time, Distance, Shielding - Facility, occupational Workers, Caregivers, Patients, Members of the Public, Appropriate Materials. As Low as Reasonably Achievable (ALARA): Culture of Safety – Justification, optimization and limitation, Procedure Appropriateness; Safety accessories: Lead aprons, thyroid shield, Goggles, movable and fixed shield barriers, ceiling mounted barriers. Radiological safety measures in interventional suites.

7. Advisory Bodies and Regulatory Authorities

International Commission on Radiological Protection (ICRP), National Council on Radiation Protection and Measurements (NCRP) , International Atomic Energy Agency (IAEA) , Atomic energy regulatory board (AERB). AERB guidelines for room layout, licensing, type approval, eLora, RSO and Pre Conception Pre Natal Diagnostic Techniques Act (PCPNDT) Shielding: Design Philosophy- Occupancy and Workload.

Knowledge of the full range of radiological diagnostic and therapeutic techniques available, in particular:

- the indications, contra-indications and complications of each method
- the factors affecting the choice of equipment, contrast media and route of approach
- the effects and side-effects of these methods

Particular emphasis should be placed on the strengths and weaknesses of the different methods in various pathological conditions. The appropriate choice of imaging and interventional techniques in the investigation and treatment of specific clinical problems should be emphasised.

The trainee is expected to keep abreast of other imaging techniques relevant to their practice.

The expected outcome at the end of this subspecialty training will be that the candidate can select the appropriate imaging strategy to demonstrate the relevant abnormalities, supervise (and perform where appropriate) the examination(s) and accurately report on the findings. The trainee should also be able to select the appropriate intervention and where required, be capable of carrying out that intervention safely to a successful conclusion.

Overview of training

For training purposes interventional radiology can be divided into vascular and non-vascular.

Clinical knowledge will be acquired by a variety of means, including close liaison with appropriate medical and surgical and radiological meetings. Multidisciplinary meetings should be emphasised.

The following inter-relationships are important:

- Vascular surgery
- Urology
- Neurological sciences
- Gastroenterology
- General surgery
- Oncology and Haematology
- Obstetrics and Gynaecology
- TB and Chest Diseases

The trainee should be encouraged and given the opportunity to attend and lead appropriate clinico-radiological and multidisciplinary meetings.

The trainee should be encouraged to attend appropriate educational meetings and courses.

The trainee should participate in and initiate relevant clinical audit.

Trainees will be expected to be familiar with current interventional radiology literature.

The trainee should be encouraged to participate in research, and to pursue one or more projects up to and including publication. An understanding of the principles and techniques used in research, including the value of clinical trials and basic biostatistics, should be acquired. Presentation of research and audit results at state and national meetings should be encouraged.

The trainee should continue to participate in the on-call rota, with appropriate consultant back up.

Acquisition of specific skills to enable:

- the conduct, supervision and accurate interpretation of all imaging techniques used to a high professional standard
- the safe and effective practice of interventional techniques in the appropriate body system(s)
- good communication with patients and professional colleagues
- accurate informed consent to be obtained
- appropriate decisions about terminating the procedure for technical reasons or grounds of

safety/comfort to the patient

A clear understanding of the role of multidisciplinary meetings, including:

- planning of investigations including the selection of appropriate tests and imaging techniques for a clinical problem
- planning and outcomes of treatment
- promoting an understanding of relevant pathology

Procedural competence will need to be reviewed at intervals, and this regular review should also assess the number of cases required in order to ensure competence.

Radiologists who devote essentially all their time to interventional radiology will be expected to undertake a wide range of complex procedures. Acquisition of the necessary expertise requires such trainees to undertake a proportionately larger number of interventional procedures.

All interventional radiologists must have a thorough knowledge of the techniques required to perform sedation and analgesia procedures, as well as patient monitoring throughout and following the procedures, and should be familiar with existing guidelines.

The trainee should be aware of local and national guidelines on consent, and be capable of obtaining informed patient consent for practical procedures.

The groupings that follow are based on the concept of modular training, and the numbers for the more routine procedures (in parentheses) range from what might be expected as a guide for someone with more than one subspecialty interest up to that which might be expected for a dedicated interventional radiologist. The lists of procedures are by no means exhaustive and certain trainees may expand their repertoire to include certain musculoskeletal (eg vertebroplasty) and other techniques.

Subspecialty training in vascular interventional radiology

- diagnostic arteriography (50–150)
- percutaneous angioplasty (65–130)
- percutaneous central venous access (10–20)
- thrombolysis
- embolisation

- percutaneous sclerosants injection
- vascular stent insertion
- foreign body retrieval
- aspiration thrombectomy
- peripheral aneurysm exclusion
- transjugular intrahepatic portosystemic shunt
- chemoembolisation
- aortic stent grafting (thoraco-abdominal)
- Cerebral AVM – embolisation
- Intracranial aneurismal coiling

Chest Intervention

- Bronchial Artery embolisation
- Lung biopsy /pleural biopsy
- Chest drainage procedures
- Vertebro plasty
- Endo vascular aortic repair

Oncology and Haematology

- Biopsy of the tumours in various sites
- Chemo embolisation
- RF/Cryo ablation
- venous stenting

Obstetrics and Gynaecology

- Uterine artery embolisation
- Vascular malformations
- Amniocentesis
- Chorionic villous biopsies
- fetal transfusion
- fetal reduction
- laser vascular ablation

Uroradiological intervention

- renal tract access, eg nephrostomy (20–40)
- ureteric dilatation/stent insertion (5–10)
- renal biopsy/cyst aspiration (5–10)
- drainage of collections
- varicocele embolisation
- fallopian tube recanalisation
- transrectal prostate biopsy (20–40)

Gastrointestinal intervention

- GI dilatations and stents (10–20)
- percutaneous gastrostomy (5–10)
- transjugular/plugged liver biopsy (5–10)
- radiofrequency ablation
- percutaneous biliary drainage procedures and/or stent insertion

Trainees should acquire experience in the practical procedures listed above, and the number of cases undertaken should be recorded in their log book.

Regardless of the technique, the consultant trainer must be satisfied that the trainee is clinically competent, as determined by an in-training performance assessment, and can consistently interpret the results of investigations accurately and reliably and can safely perform interventional techniques.

CLINICAL SKILLS FOR Interventional Radiology

1. Good familiarity and adequate skills in performing / interpreting vascular imaging modalities (Ultra Sound, Doppler, CT angiograms, MR angiograms, MRI)
2. Work up of cases and decide on feasibility for intervention
3. Active involvement in the inter-departmental discussions
4. On call interventional duty
5. Independent skills in diagnostic interventional procedures
6. Partial independent skills in therapeutic interventional procedures

IV. Postings:

Year	Area	Duration
Year 1	US (general) and doppler	2 months
	DSA	4 months
	CT, CTA and CT guided procedures	2 months
	Peripheral posting – ICU	1 month
	Peripheral posting – other department (Vascular Surgery)	1 month
	Fetal intervention	1 month
	Ultra sound guided procedures	1 month
Year 2	US (general) and doppler	2 months
	DSA	5 months
	CT, CTA and CT guided procedures	1 months
	MRI and MRA	1 month
	Fetal Intervention	3 month
Year 3	US (general) and doppler	2 months
	DSA	5 months
	Fetal Intervention	1 months
	CT, CTA and CT guided procedures	1 months
	MRI and MRA	1 months
	Postings in center doing more advanced intervention	2 months

Academic sessions

- To attend regular morning teaching sessions of the department everyday 8 -8.30am
- Dedicated interventional topic discussions and journal reading

V. Bioethics

1. Respect human life and the dignity of every individual.
2. Refrain from supporting or committing crimes against humanity and condemn all such acts.
3. Treat the sick and injured with competence and compassion and without prejudice and apply the knowledge and skills when needed.
4. Protect the privacy and confidentiality of those for whom we care and breach that confidence only when keeping it would seriously threaten their health and safety or that of others.
5. Work freely with colleagues to discover,develop, and promote advances in medicine and public health that ameliorate suffering and contribute to human well being.
6. Educate the public about present and future threats to the health of humanity.
7. Advocate for social,economic,educational and political changes that ameliorate suffering and contribute to human well being.
- 8.Teach and mentor those who follow us, for they are the future of our caring profession.

VI. RESEARCH WORK:

The candidate will be trained in the ability to

- Frame a research question.
- Plan a study to answer the question.
- Collect the relevant information and
- Evaluate appropriately the collected data to draw a conclusion.

The candidate should become conversant with the reporting of these results as a research paper, in journals and as a presentation in conferences.

The activities would consist of:

Planning and organizing relevant animal / clinical studies to be submitted as a dissertation at the end of the course.

Students should compulsorily attend the Research Methodology workshop conducted by the University within first six months of D.M Course.

VII. LOG BOOK:

The Postgraduate student of a Postgraduate Degree Course in Super specialties shall maintain Log Book of the work carried out by them and the training programme undergone during the period of training including details of surgical operations assisted or done independently by.

The Log Book shall be checked and assessed by the faculty members imparting the training.

Periodical evaluation of Log Book to be done by the Head of the Department as per 52nd SAB.

The Evaluation of the candidates in both theory and practical aspects will help the candidate in the improvement of his/her knowledge skills & attitude.

VIII. COMPETENCY ASSESSMENT:

1. Communication / Commitment / Contribution / Compassion towards patients and Innovation
2. Implementation of Newly learnt techniques
3. Documentation of case sheets / discharge Summary / Review
4. Number of cases presented in Clinical Meetings/ Journal Clubs / Seminars / Papers presented in Conference.
5. No. Of Medals/ Certificates won in the conference / Quiz competitions and other academic meetings with details.

*** The examiners shall peruse the records (log book) of the following components at the time of viva-voce examination to assess the performance of the candidates during their course of studies:**

- (i) Communication / Commitment / Contribution / Compassion towards patients and Innovation
- (ii) Implementation of Newly learnt techniques
- (iii) Documentation of case sheets / discharge Summary / Review
- (iv) Number of cases presented in Clinical Meetings/Journal Clubs / Seminars / Papers presented in Conference.
- (v) No. Of Medals/ Certificates won in the conference / Quiz competitions and other academic meetings with details.

1. Communication / Commitment / Contribution / Compassion towards patients and Innovation
2. Implementation of Newly learnt techniques
3. Documentation of case sheets / discharge Summary / Review
4. Number of cases presented in Clinical Meetings/ Journal Clubs / Seminars / Papers presented in Conference.
5. No. Of Medals/ Certificates won in the conference / Quiz competitions and other academic meetings with details.

*** This will be implemented from 2017-18 admission onwards. As resolved in the 55th meeting of the Standing Academic Board held on 18.0.2018.**

IX. THEORY EXAMINATION:

PAPER - I Basic Sciences (Consisting of vascular anatomy, Radiation physics and instrumentation related to interventional radiology)

PAPER -II Vascular interventional radiology

PAPER -III Non Vascular and Fetal interventional radiology

PAPER - IV Recent Advances in Interventional Radiology

Each paper will contain:

1. Essay questions	(2)	2 X 15 = 30 Marks
2. Short Notes	10)	10 X 7 = 70 Marks

	Total	100 Marks

X. CLINICAL EXAMINATION

PARTICULARS	TIME FOR CANDIDATES TO EXAMINE THE CASES	TIME FOR EXAMINERS TO QUESTION THE CANDIDATES	MAXIMUM MARKS
Long Case	1 case x 30 minutes	45 minutes	100
Shot case	3 cases x 15 minutes (one worked out case, one doppler demonstraion & one interventional procedure	One hour (15 minutes + 15 minutes + 30 minutes)	150

	demonstration)		
Spotters	25 x 1 minute	25 minutes	50
OSCE	5 session x 5 minutes	25 minutes	50
Viva voce		30 minutes	100
Log book			50
		Total	500

As per Medical Council of India Post Graduate Medical Education Regulations 2000 (amended upto 10th August 2016) clause **13.9 A Postgraduate student of a Postgraduate degree Course in broad specialties/ Super Specialties would be required to present one poster presentation Overall: to read one paper at a National/State conference and to present one Research paper which should be published/accepted for publication/sent for publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate Degree Examination.**

Apart from Poster/Oral paper presentation in National/State conferences, the Research paper published by the candidate in the University Journal of Medical Sciences will be considered as equivalent to the Research Paper as mentioned in 13.9. clause.

Case Reports can also be published in University Journal of Medical Sciences but case reports will not be considered as Research Paper.

The candidate can also present Research Paper as per Clause 13.9 of Post Graduate Education Regulation 2000, and if the article sent for publication by the candidate as primary author or corresponding author which has not yet been published/accepted for publication, the candidate should submit a letter from the HOD, stating that the article sent for publication is of publishable merit and the proof of the Research Article submitted to the Journal for publication should be sent to the university forwarded through the HOD [as per 53rd SAB]

The student can submit articles for the University journal anytime from the time of registration in the University till 6 months prior to theory examination.

OSCE: (5 Stations)

1. Radiation physics instrumentation and radiation protection.
2. Vascular interventional radiology – instruments and techniques
3. Non vascular interventional radiology - instruments and techniques
4. Regulatory bodies and recent advances
5. Contract agents, drugs and embolic materials

XI. Suggested books / journals / reading material:

Author Name	Name of the Books	Publishing Company
Alrbert L. Abrams	Abrams Angiography, Vascular and Interventional Radiology V- I	Medical Education and Research Inc.
Alrbert L. Abrams	Abrams Angiography, Vascular and Interventional Radiology V- II	Medical Education and Research Inc.
Alrbert L. Abrams	Abrams Angiography, Vascular and Interventional Radiology V- III	Medical Education and Research Inc.
Paul Ross	An Atlas of Normal Vertebral Angiograms.	Butter worth Group
Paul Ross	An Atlas of Normal Vertebral Angiograms.	Butter worth Group
Kazuhiko	Cerebral Angio – CT	Raven Press
G. Ansel	Complications in Diagnostic Imaging	Black well scientific Pub
G. Ansell	Complications in diagnostic radiology.	Blackwell scientific
Joseph K. Lee	Computed Body Tomography. Vol - I	Raven Press Books Ltd.
Joseph K. Lee	Computed Body Tomography. Vol – II	Raven Press Books Ltd.
Charles F. Lanzleri	Computed Tomography and Magnetic Resonance Imaging of the whole body Vol - I	Mosby – Year book Inc.
Charles F. Lanzleri	Computed Tomography and Magnetic Resonance Imaging of the whole body Vol – II	Mosby – Year book Inc.
T. A. Lie	Congenital Anomalies of the Carotid Arteries	Williams & Wilkins
Malcolm Carpenter	Core Text of Neuro Anatomy	Williams and Wilkins
Sandler	Correlative Imaging. Nuclear medicine Magnetic Resonance, Computed Tomography, Ultrasound	Williams & Wilkins
Traveras	Diagnostic Neuroradiology Vol – I	Williams & Wilkins
Traveras	Diagnostic Neuroradiology Vol – II	Williams & Wilkins
Grainger	Diagnostic Radiology 3rd edition Vol – I	Churchill Livingstone
Grainger	Diagnostic Radiology 3rd edition Vol – II	Churchill Livingstone
Grainger	Diagnostic Radiology 3rd edition Vol – III	Churchill Livingstone
M. Pinson	Emergency Interventional Radiology	Little Brown
JJ Connors	Interventional Neuroradiology Practical Techniques.	W.B. Saunders Company
Albert Mass	Interventional Radiologic Techniques. Computed Tomography and Ultrasonography.	Academic Press Inc.

Joseph I Ferrucci	Interventional Radiology of the Abdomen	Williams & Wilkins
Ernest J. Ring	Interventional radiology principles and Techniques	Little Brown
Wilfrido R Castaneda	Interventional Radiology Vol – I	Williams & Wilkins
Wilfrido R Castaneda	Interventional Radiology Vol – II	Williams & Wilkins
Zwiebel	Introduction to Vascular Ultrasonography. 3rd edition.	
Scott Atlas	Magnetic Resonance Imaging of the Brain and Spine. Vol - I	
Scott Atlas	Magnetic Resonance Imaging of the Brain and Spine. Vol – II	
Bushberg, Seibert A, Leidholdt and Boone J.	The essential Physics of Medical Imaging	
David J Dowset, Patrick Kenny and Eugene Johnston.	The Physics of Diagnostic Imaging	Chapman and Hall Medical
Wolbarst AB, Capasso P and Wyant A.	Medical Imaging essentials for Physicians	Wiley Blackwell

Note : The Editions are as applicable and the latest editions shall be the part of the syllabus.

D.M. - CRITICAL CARE MEDICINE

THE TAMIL NADU Dr. MGR MEDICAL UNIVERSITY,
CHENNAI

Syllabus – D.M Critical Care

1. AIMS:

The syllabus focuses on training specialists and equipping them with knowledge and skills to deal with acutely ill patients to provide a wholesome care for the patient and provide necessary support for the family. It also aims to equip the specialist to develop skills in other areas like, research, communication, and to work as a team.

2. OBJECTIVES:

Critical Care physicians working in closed ICU's improve the outcome of critically ill in comparison to an open ICU model. A critically ill patient would have multiple organ failure and it is essential that the treating physician have in depth knowledge in various medical and surgical specialties. The Intensivist has to be equipped knowledge in all the specialties of medicine to holistically manage patients in the critical care unit. He / she should also be competent with soft skills like communication, working as a team. He / She should also be able to be technically sound with procedures and use of equipments and interpretation of the findings to provide quick and timely treatment, which could be life saving in an acutely ill patient. Being a relatively new specialty in India, he / she should also be able to train medical and paramedical personnel to meet the ever increasing demand of manpower requirements in critical care. Critical illness has a wide scope for research and the specialist should also be equipped with research skills. Treating critically ill is a teamwork coordinating specialists and paramedical personnel and also involving the family in decision-making. Increased awareness of the public and litigation in health care necessitates to work within legal framework of our country. The scope of this course is to cover all the above areas.

3. THEORY SYLLABUS

(A). General curriculum

o Diagnosis

- Assessment of critically ill
- Investigation
- Monitoring
- Interpretation of data

o Practical Procedures

- o Comfort, Pain-Relief and Recovery
- o Basics of Pediatric Critical Care
- o Physics & Clinical Measurement
- o Research Methods
 - o Applied Anatomy
 - o Applied Physiology & Biochemistry
 - o Applied Pharmacology

(B) Advanced curriculum

- o Resuscitation and Initial Management of the Acutely Ill Patients o
- Disease Management
 - o Therapeutic Interventions/Organ System Support in Single or multiple organ failure
 - o Inter and Intra hospital Transport of critically ill
 - o Peri-operative Care

(C) Professional qualities curriculum

- o Patient Safety and Health Systems Management
- o Professionalism and Ethics
- o End of Life Care

Course contents divided into Cognitive, psychomotor and affective domains:

Cognitive Domain

The course contents under the cognitive domain include following:

1. Resuscitation and Initial Management of the Acutely Ill Patients
2. Diagnosis: Assessment, Investigation, Monitoring and Data Interpretation of the acutely ill patients
3. Disease Management
4. Therapeutic Interventions/Organ System Support in Single or Multiple Organ Failure
5. Peri-operative Care
6. Paediatric Care
7. Transportation
8. Physics & Clinical Measurement
9. Research Methods
10. Applied Anatomy
11. Physiology & Biochemistry

12. Pharmacology

1. Resuscitation and Initial Management of the Acutely Ill Patients

- 1.1 Timely approach to the recognition, assessment and stabilization of the acutely ill patients with disordered physiology
- 1.2 Cardiopulmonary resuscitation
- 1.3 Post-resuscitation management
- 1.4 Triage and prioritization of patients for ICU admission
- 1.5 Assessment and initial management of the trauma patient
- 1.6 Assessment and initial management of the patient with burns
- 1.7 Fundamentals of the management of mass casualties.
- 1.8 Fundamentals of disaster management.

2. Diagnosis : Assessment, Investigation, Monitoring and Data Interpretation of the acutely ill patients

- 2.1 History taking and clinical examination
- 2.2 Timely and appropriate investigations
- 2.3 Understanding of echocardiography (transthoracic/transoesophageal), Indications and interpretation of results
- 2.4 Understanding of Electrocardiography (ECG/EKG), Indications and interpretation of the results
- 2.5 Appropriate microbiological sampling and interpretation of results
- 2.6 Interpretation of results from blood gas samples
- 2.7 Organization and interpretation of wide range of clinical imaging including bed-side chest x- rays, ultrasound, CT scan, MRI and nuclear imaging relevant for the diagnosis and management of critically ill and injured patients.
- 2.8 Understanding and interpretation of physiological variables
- 2.9 Integration of clinical findings with laboratory, radiology, microbiology and other investigations to form appropriate differential diagnosis and management strategy

3. Disease Management

Acute disease

- 3.1 Management of the care of the critically ill patient with following specific acute medical conditions
 - Acute Myocardial Infarction
 - Pulmonary Embolism
 - Cardiogenic Shock
 - Life Threatening Arrhythmias
 - Pericardial Tamponade
 - Acute Ischemic Stroke
 - Intracranial Hemorrhage
 - Status Epilepticus
 - Head & Spine Trauma

- Acute neuromuscular failure (OPP/GBS/MG/Snakebite, etc)
- Acute severe Asthma
- Acute Exacerbation of COPD
- Severe Community acquired pneumonia
- Chest Trauma
- Acute hypoxemia Respiratory Failure including ARDS
- Acute GI Bleed
- Acute Liver Failure
- Acute Pancreatitis
- Acute Abdomen
- Neutropenia
- Acute coagulation disorders
- Thrombocytopenia
- Sepsis and Septicemic Shock
- Meningitis
- Acute Hemorrhagic Fevers
- Severe forms of tropical infections like Malaria, Typhoid etc.
- Acute Renal Failure
- Eclampsia
- Acute poisoning
- Tropical emergencies namely tropical infections and environmental emergencies like heat stroke
- Toxicology

Chronic Disease

3.2 Identifications of the implications of chronic and co morbid disease in the acutely ill patients

Organ System Failure

- 3.3 Management of patients with, or at risk of, circulatory failure
- 3.4 Management of patients with, or at risk of, acute renal failure
- 3.5 Management of patients with, or at risk of, acute liver failure
- 3.6 Management of patients with, or at risk of, neurological impairment
- 3.7 Management of patients with, or at risk of, acute gastrointestinal failure
- 3.8 Management of patients with, or at risk of, acute lung injury syndromes (ALI/ ARDS)
- 3.9 Management of patients with, or at risk of, septic shock
- 3.10 Management of patients with, or at risk of, severe sepsis/septic shock with multi-organ dysfunction / failure
- 3.11 Management of patients following intoxication with drugs or environmental toxins
- 3.12 Recognition of life-threatening maternal peri-partum complications like acute fatty liver of pregnancy, HELLP and eclampsia/preeclampsia etc. and their management

4. Therapeutic Interventions/Organ System Support in Single or Multiple Organ Failure

- 4.1. Principles of safe prescription
- 4.2. Principles of safe delivery of life-support therapies
- 4.3. Antimicrobial drug therapy – Fundamental principles and ICU specific issues.
- 4.4 Antimicrobial Stewardship
- 4.4 Transfusion therapy - Fundamental principles and ICU specific issues
- 4.5 Circulatory therapies - Fundamental principles and ICU specific issues pertaining to fluid therapy including dynamic variables of fluid responsiveness and vasoactive/inotropic drugs
- 4.6 Mechanical circulatory assist devices
- 4.7 Initiation, management and weaning of the patients from invasive and non-invasive ventilatory support
- 4.8 Initiation, management and weaning of the patients from renal replacement therapy
- 4.9 Management of electrolyte, glucose and acid-base disturbances
- 4.10 Nutritional assessment and support

5. Peri-operative Care

- 5.1 Management of the pre & post-operative care of the high-risk surgical patients
- 5.2 Fundamentals of the management of the care of patients following cardiac surgery
- 5.3 Fundamentals of the management of the patients following craniotomy
- 5.4 Fundamentals of the management of the patients following solid organ transplantation and bone marrow transplantation
- 5.5 Fundamentals of the management of the pre and post-operative trauma care.

6. Paediatric Care

- 6.1 Understanding of the recognition of the acutely ill child and initial management of paediatric emergencies.

7. Transportation

- 7.1 Transportation of the mechanically ventilated critically ill patient outside the ICU, within and out of hospital
- 7.2 Understanding of the special considerations required during patient transport by air

8. Physics & Clinical Measurement

Mathematical Concepts:

- 8.1 Relationships and graphs
- 8.2 Concepts of exponential functions and logarithms: wash-in and washout
- 8.3 Basic measurement concepts: linearity, drift, hysteresis, signal:noise ratio, static and dynamic response
- 8.4 SI units: fundamental and derived units
- 8.5 Other systems of units where relevant to ICM (e.g. mmHg, bar, atmospheres)
- 8.6 Simple mechanics: Mass, Force, Work and Power

Gases & Vapours:

- 8.7 Absolute and relative pressure.
- 8.8 The gas laws; triple point; critical temperature and pressure
- 8.9 Density and viscosity of gases.
- 8.10 Laminar and turbulent flow; Poiseuille's equation, the Bernoulli principle
- 8.11 Vapour pressure: saturated vapour pressure
- 8.12 Measurement of volume and flow in gases and liquids.
- 8.13 The pneumotachograph and other respirometers.
- 8.14 Principles of surface tension

Electricity & Magnetism:

- 8.15 Basic concepts of electricity, magnetism and Bridge circuits
- 8.16 Capacitance, inductance and impedance
- 8.17 Amplifiers: bandwidth, filters
- 8.18 Amplification of biological potentials: ECG, EMG, EEG.
- 8.19 Sources of electrical interference
- 8.20 Processing, storage and display of physiological measurements

Electrical Safety:

- 8.21 Principles of cardiac pacemakers and defibrillators
- 8.22 Electrical hazards: causes and prevention.
- 8.23 Electrocution, fires and explosions.
- 8.24 Diathermy and its safe use
- 8.25 Basic principles and safety of lasers
- 8.26 Basic principles of ultrasound and the Doppler effect

Pressure & Flow Monitoring:

- 8.27 Principles of pressure transducers
- 8.28 Resonance and damping, frequency response
- 8.29 Measurement and units of pressure.
- 8.30 Direct and indirect methods of blood pressure measurement; arterial curve analysis
- 8.31 Principles of pulmonary artery and wedge pressure measurement
- 8.32 Cardiac output: Fick principle, thermodilution

Clinical Measurement:

- 8.33 Measurement of gas and vapour concentrations, (oxygen, carbon dioxide, nitrous oxide, and volatile anaesthetic agents) using infrared, paramagnetic, fuel cell, oxygen electrode and mass spectrometry methods
- 8.34 Measurement of H^+ , pH, pCO_2 , pO_2
- 8.35 Measurement CO_2 production/ oxygen consumption/ respiratory quotient
- 8.36 Colligative properties: osmometry
- 8.37 Simple tests of pulmonary function e.g. peak flow measurement, spirometry.
- 8.38 Capnography
- 8.39 Pulse oximetry

- 8.40 Monitoring of neuromuscular blockade
- 8.41 Quantification of pain
- 8.51 Bispectral Index

9. Research Methods

Data Collection:

- 9.1 Simple aspects of study design (research question, selection of the method of investigation, population, intervention, outcome measures)
- 9.2 Power analysis
- 9.3 Defining the outcome measures and the uncertainty of measuring them
- 9.4 The basic concept of meta-analysis and evidence based medicine

Descriptive Statistics:

- 9.5 Types of data and their representation
- 9.6 The normal distribution as an example of parametric distribution
- 9.7 Indices of central tendency and variability

Deductive & Inferential Statistics, Literature reading & writing

- 9.8 Simple probability theory and the relation to confidence intervals
- 9.9 The null hypothesis.
- 9.10 Choice of simple statistical tests for different data types
- 9.11 Type I and type II errors
- 9.12 Inappropriate use of statistics
- 9.12 Reading and interpreting scientific papers
- 9.13 Writing scientific (research) papers

10. Applied Anatomy

Respiratory System:

- 10.1 Mouth, nose, pharynx, larynx, trachea, main bronchi, segmental bronchi, structure of bronchial tree and differences in the paediatric airway
- 10.2 Airway and respiratory tract, blood supply, innervation and lymphatic drainage
- 10.3 Pleura, mediastinum and its contents
- 10.4 Lungs, lobes, microstructure of lungs
- 10.5 Diaphragm, other muscles of respiration, innervation
- 10.6 The thoracic inlet and 1st rib
- 10.7 Interpretation of a chest x-ray

Cardiovascular System:

- 10.8 Heart, chambers, conducting system, blood and nerve supply
- 10.9 Congenital deviations from normal anatomy
- 10.10 Pericardium

- 10.11 Great vessels, main peripheral arteries and veins
- 10.12 Foetal and materno-foetal circulation

Nervous System:

- 10.13 Brain and its subdivisions
- 10.14 Spinal cord, structure of spinal cord, major ascending & descending pathways
- 10.15 Spinal meninges, subarachnoid & extradural space, extradural space-contents
- 10.16 Cerebral blood supply
- 10.17 CSF and its circulation
- 10.18 Spinal nerves, dermatomes
- 10.19 Brachial plexus, nerves of arm
- 10.20 Intercostal nerves
- 10.21 Nerves of abdominal wall
- 10.22 Nerves of leg and foot
- 10.23 Autonomic nervous system
- 10.24 Sympathetic innervation, sympathetic chain, ganglia and plexuses
- 10.25 Parasympathetic innervation.
- 10.26 Stellate ganglion
- 10.27 Cranial nerves: base of skull: trigeminal ganglion
- 10.28 Innervation of the larynx
- 10.29 Eye and orbit

Vertebral Column:

- 10.30 Cervical, thoracic, and lumbar vertebrae
- 10.31 Interpretation of cervical spinal imaging in trauma
- 10.32 Sacrum, sacral hiatus
- 10.33 Ligaments of vertebral column
- 10.34 Surface anatomy of vertebral spaces, length of cord in child and adult

Surface Anatomy:

- 10.35 Structures in ante-cubital fossa
- 10.36 Structures in axilla: identifying the brachial plexus
- 10.37 Large veins and anterior triangle of neck
- 10.38 Large veins of leg and femoral triangle
- 10.39 Arteries of arm and leg
- 10.40 Landmarks for tracheostomy, cricothyrotomy
- 10.41 Abdominal wall (including the inguinal region): landmarks for suprapubic urinary and peritoneal lavage catheters
- 10.42 Landmarks for intrapleural drains and emergency pleurocentesis
- 10.43 Landmarks for pericardiocentesis

Abdomen:

- 10.44 Gross anatomy of intra-abdominal organs
- 10.45 Blood supply to abdominal organs and lower body

11. Physiology & Biochemistry

General:

- 11.1 Organisation of the human body and homeostasis
- 11.2 Variations with age
- 11.3 Function of cells; genes and their expression
- 11.4 Mechanisms of cellular and humoral defense
- 11.5 Cell membrane characteristics; receptors
- 11.6 Protective mechanisms of the body
- 11.7 Genetics & disease processes

Biochemistry:

- 11.8 Acid base balance and buffers, Ions e.g. Na, K, Ca, Cl, HCO₃, Mg, PO₄
- 11.9 Enzymes and Cellular and intermediary metabolism

Body Fluids:

- 11.10 Capillary dynamics and interstitial fluid
- 11.11 Oncotic pressure
- 11.12 Osmolarity: osmolality, partition of fluids across membranes
- 11.13 Lymphatic system
- 11.14 Special fluids: cerebrospinal, pleural, pericardial and peritoneal fluids

Haematology & Immunology:

- 11.15 Red blood cells: haemoglobin and its variants
- 11.16 Blood groups
- 11.17 Haemostasis and coagulation; pathological variations
- 11.18 White blood cells
- 11.19 Inflammation and its disorders
- 11.20 Immunity and allergy

Muscle:

- 11.21 Action potential generation and its transmission
- 11.22 Neuromuscular junction and transmission
- 11.23 Muscle types
- 11.24 Skeletal muscle contraction
- 11.25 Motor unit
- 11.26 Muscle wasting
- 11.27 Smooth muscle contraction: sphincters

Heart & Circulation:

- 11.28 Cardiac muscle contraction
- 11.29 The cardiac cycle: pressure and volume relationships
- 11.30 Rhythmicity of the heart
- 11.31 Regulation of cardiac function; general and cellular

- 11.32 Control of cardiac output (including the Starling relationship)
- 11.33 Fluid challenge and heart failure
- 11.34 Electrocardiogram and arrhythmias
- 11.35 Neurological and humoral control of systemic blood pressures, blood volume and blood flow (at rest and during physiological disturbances e.g. exercise, haemorrhage and Valsalva manoeuvre)
- 11.36 Peripheral circulation: capillaries, vascular endothelium and arteriolar smooth muscle, autoregulation and the effects of sepsis and the inflammatory response on the peripheral vasculature
- 11.37 Characteristics of special circulations including: pulmonary, coronary, cerebral, renal, portal and foetal

Renal Tract:

- 11.38 Blood flow, glomerular filtration and plasma clearance
- 11.39 Tubular function and urine formation
- 11.40 Endocrine functions of kidney
- 11.41 Assessment of renal function
- 11.42 Regulation of fluid and electrolyte balance
- 11.43 Regulation of acid-base balance
- 11.44 Micturition
- 11.45 Pathophysiology of acute renal failure

Respiration:

- 11.46 Gaseous exchange: O₂ and CO₂ transport, hypoxia and hyper- and hypocapnia, hyper and hypobaric pressures
- 11.47 Functions of haemoglobin in oxygen carriage and acid-base equilibrium
- 11.48 Pulmonary ventilation: volumes, flows, dead space.
- 11.49 Effect of IPPV and PEEP on lungs and circulation
- 11.50 Mechanics of ventilation: ventilation/perfusion abnormalities
- 11.51 Control of breathing, acute and chronic ventilatory failure, effect of oxygen therapy
- 11.52 Non-respiratory functions of the lungs
- 11.53 Cardio-respiratory interactions in health & disease

Nervous System:

- 11.54 Functions of nerve cells: action potentials, conduction, synaptic mechanisms and transmitters
- 11.55 The brain: functional divisions
- 11.56 Intracranial pressure: cerebrospinal fluid, blood flow
- 11.57 Maintenance of posture
- 11.58 Autonomic nervous system: functions
- 11.59 Neurological reflexes Motor function: spinal and peripheral
- 11.60 Senses: receptors, nociception, special senses
- 11.61 Pain: afferent nociceptive pathways, dorsal horn, peripheral and central mechanisms, neuromodulatory systems, supraspinal mechanisms, visceral pain, neuropathic pain, influence of therapy on nociceptive mechanisms
- 11.62 Spinal cord: anatomy and blood supply, effects of spinal cord section

Liver:

- 11.63 Functional anatomy and blood supply
- 11.64 Metabolic functions
- 11.65 Tests of function

Gastrointestinal:

- 11.66 Gastric function; secretions, nausea and vomiting
- 11.67 Gut motility, sphincters and reflex control
- 11.68 Digestive functions and enzymes
- 11.69 Nutrition: calories, nutritional fuels and sources, trace elements, growth factors

Metabolism and Nutrition:

- 11.70 Nutrients: carbohydrates, fats, proteins, vitamins, minerals and trace elements
- 11.71 Metabolic pathways, energy production and enzymes; metabolic rate
- 11.72 Hormonal control of metabolism: regulation of plasma glucose, response to trauma
- 11.73 Physiological alterations in starvation, obesity, exercise and the stress response
- 11.74 Body temperature and its regulation

Endocrinology:

- 11.75 Mechanisms of hormonal control: feedback mechanisms, effect on membrane and intracellular receptors
- 11.76 Central neuro-endocrine interactions
- 11.77 Adrenocortical hormones
- 11.78 Adrenal medulla: adrenaline (epinephrine) and noradrenaline (norepinephrine)
- 11.79 Pancreas: insulin, glucagon and exocrine function
- 11.80 Thyroid and parathyroid hormones and calcium homeostasis

Pregnancy:

- 11.81 Anatomical and Physiological changes associated with a normal pregnancy and delivery
- 11.82 Materno-foetal, foetal and neonatal circulation
- 11.83 Functions of the placenta: placental transfer
- 11.84 Foetus: changes at birth

12. Pharmacology**Principles of Pharmacology:**

- 12.1 Dynamics of drug-receptor interaction
- 12.2 Agonists, antagonists, partial agonists, inverse agonists
- 12.3 Efficacy and potency
- 12.4 Tolerance
- 12.5 Receptor function and regulation

- 12.6 Metabolic pathways; enzymes; drug: enzyme interactions; Michaelis-Menten equation
- 12.7 Enzyme inducers and inhibitors.
- 12.8 Mechanisms of drug action Ion channels: types: relation to receptors.
- 12.9 Gating mechanisms.
- 12.10 Signal transduction: cell membrane/receptors/ion channels to intracellular molecular targets, second messengers
- 12.11 Action of gases and vapours
- 12.12 Osmotic effects
- 12.13 pH effects
- 12.14 Adsorption and chelation
- 12.15 Mechanisms of drug interactions:
- 12.16 Inhibition and promotion of drug uptake.
- 12.17 Competitive protein binding.
- 12.18 Receptor inter-actions.
- 12.19 Effects of metabolites and other degradation products.

Pharmacokinetics & Pharmacodynamics

- 12.20 Drug uptake from: gastrointestinal tract, lungs, nasal, transdermal, subcutaneous, IM, IV, epidural and intrathecal routes
- 12.21 Bioavailability
- 12.22 Factors determining the distribution of drugs: perfusion, molecular size, solubility, protein binding.
- 12.23 The influence of drug formulation on disposition
- 12.24 Distribution of drugs to organs and tissues:
- 12.25 Body compartments Influence of specialised membranes: tissue binding and solubility
- 12.26 Materno-foetal distribution
- 12.27 Distribution in CSF and extradural space
- 12.28 Modes of drug elimination:
- 12.29 Direct excretion
- 12.30 Metabolism in organs of excretion: phase I & II mechanisms
- 12.31 Renal excretion and urinary pH 12.32
Non-organ breakdown of drugs
- 12.33 Pharmacokinetic analysis:
- 12.34 Concept of a pharmacokinetic compartment
- 12.35 Apparent volume of distribution
- 12.36 Orders of kinetics
- 12.37 Clearance concepts applied to whole body and individual organs
- 12.38 Simple 1 and 2 compartmental models:
- 12.39 Concepts of wash-in and washout curves
- 12.40 Physiological models based on perfusion and partition coefficients
- 12.41 Effect of organ blood flow: Fick principle
- 12.42 Pharmacokinetic variation: influence of body size, sex, age, disease, pregnancy, anaesthesia, trauma, surgery, smoking, alcohol and other drugs
- 12.43 Effects of acute organ failure (liver, kidney) on drug elimination Influence of renal replacement therapies on clearance of commonly used drugs

- 12.44 Pharmacodynamics: concentration-effect relationships: hysteresis
- 12.45 Pharmacogenetics: familial variation in drug response
- 12.46 Adverse reactions to drugs: hypersensitivity, allergy, anaphylaxis, anaphylactoid reactions
- 12.47 Therapeutic Drug monitoring

Systemic Pharmacology

- 12.47 Hypnotics, sedatives and intravenous anaesthetic agents
- 12.48 Simple analgesics
- 12.49 Opioids and other analgesics; Opioid antagonists
- 12.50 Non-steroidal anti-inflammatory drugs
- 12.51 Neuromuscular blocking agents (depolarising and non-depolarising) and anti cholinesterases
- 12.52 Drugs acting on the autonomic nervous system (including inotropes, vasodilators vasoconstrictors, antiarrhythmics, diuretics)
- 12.53 Drugs acting on the respiratory system (including respiratory stimulants and bronchodilators)
- 12.54 Antihypertensives
- 12.55 Anticonvulsants
- 12.56 Anti-diabetic agents
- 12.57 Diuretics
- 12.58 Antibiotics
- 12.59 Corticosteroids and other hormone preparations
- 12.60 Antacids. Drugs influencing gastric secretion and motility
- 12.61 Antiemetic agents
- 12.62 Local anaesthetic agents
- 12.63 Immunosuppressants
- 12.64 Principles of therapy based on modulation of inflammatory mediators indications, actions and limitations
- 12.65 Plasma volume expanders
- 12.66 Antihistamines
- 12.67 Antidepressants
- 12.68 Anticoagulants
- 12.69 Vitamins and trace elements

Psychomotor Domain

The course contents under the psychomotor domain include various intensive-care practical-procedures related to various organ systems.

1. Respiratory system

- 1.1. Oxygen therapy - Fundamental principles and ICU specific issues
- 1.2. Fibreoptic laryngoscopy

- 1.3. Emergency airway management
- 1.4. Difficult and failed airway management
- 1.5. Endotracheal suction
- 1.6. Fibreoptic bronchoscopy and BAL in the intubated patient
- 1.7. Percutaneous tracheostomy and minitracheostomy
- 1.8. Thoracocentesis via a chest drain
- 1.9. Lung Ultrasound

2. Cardiovascular system

- 2.1. Peripheral venous catheterization
- 2.2. Arterial catheterization
- 2.3. Surgical isolation of vein/artery
- 2.4. Ultrasound techniques for vascular localization, assessment of shock states and doppler.
- 2.5. Central venous catheterization
- 2.6. Defibrillation and cardioversion
- 2.7. Cardiac pacing (transvenous or transthoracic)
- 2.8. Fundamentals of pericardiocentesis
- 2.9. Measurement of cardiac output and derived haemodynamic variable

3. Central Nervous System

- 3.1. Lumbar puncture (Intrathecal/spinal)
- 3.2. Basic understanding of neuraxial pain medication like epidural analgesia
- 3.3 Basics of EEG and EMG and nerve conduction studies/
- 3.4 Ultrasound assessment of intracranial pressure and cerebral blood flow.

4. Gastrointestinal System

- 4.1. Nasogastric tube placement
- 4.2. Abdominal paracentesis
- 4.3. Sengstaken tube (or equivalent) placement
- 4.4. Fundamentals of upper GI endoscopy
- 4.5. Measurement and interpretation of intra-abdominal pressure
- 4.6 FAST (Focussed abdominal sonography in trauma)

5. Genitourinary System

- 5.1. Urinary catheterization

Affective Domain

The course contents under the affective domain include following:

1. Comfort, Pain-Relief and Recovery
2. End of Life Care
3. Patient Safety and Health Systems Management
4. Professionalism

1. Comfort, Pain-Relief and Recovery

- 1.1 Understanding of the physical and psychosocial consequences of critical illness for patients and families and methods of prevention and management
- 1.2 Assessment, prevention and treatment of pain and delirium
- 1.3 Sedation, analgesia and neuromuscular blockade
- 1.4 Communication of the continuing care requirements of patients at ICU discharge to health care professionals, patients and relatives
- 1.5 Management of the safe and timely discharge of patients from the ICU
- 1.6 Hospice Care

2. End of Life Care

- 2.1. Management of the process of withholding or withdrawing treatment with the multidisciplinary team
- 2.2. Discussion of the end of life care with patients and their families/surrogates
- 2.3. Management of palliative care of the critically ill patient
- 2.4. Brain-stem death testing /certification
- 2.5. Management of the physiological support of the organ donor
- 2.6 Organ donation by brain death and cardiac death criteria.

3. Patient Safety and Health Systems Management

- 3.1. Leadership in daily multidisciplinary ward round
- 3.2. Infection control in ICU
- 3.3. Environmental hazards
- 3.4. Safety for patients & staff in ICU
- 3.5. Understanding of critical incidents, adverse events, complications related to ICU care
- 3.6. Organisation of multi-disciplinary case conference and counselling sessions with family
- 3.7. Critical appraisal and application of guidelines, protocols and care bundles
- 3.8. Understanding of scoring systems for assessment of severity of illness and case mix
- 3.9. Understanding of the managerial & administrative responsibilities of the critical care specialist
- 3.10 Participation in quality assurance programs
 - Audit
 - Adverse drug reaction
 - Critical incident reporting
 - Morbidity and mortality meetings

- Risk analysis
- 3.12 Handling of deceased with highly infectious condition (e.g Ebola, Nephra etc)
- 3.13 Designing a new critical Care Unit
- 3.14 IHR Guidelines for management of emergent infections.

4. Ethics, Attitudes and Professionalism

Communication skills

- 4.1. Communication with patients and relatives
- 4.2. Communication with other members of the health care team
- 4.3. Management of records/ documentation
- 4.4. Teaching and training of the multidisciplinary members of critical care team

Professional relationships with patients and relatives

- 4.5. Involvement with patients (or their surrogates) in decision making
- 4.6. Understanding of cultural and religious beliefs and an awareness of their impact on decision making
- 4.7. Understanding of privacy, dignity, confidentiality and legal constraints on the use of patient data

Professional relationships with members of the health care team

- 4.8. Collaboration, consultation, team work, management of ICU burn out, conflict management / resolution
- 4.9. Continuity of care through effective hand-over of clinical information
- 4.10. Supportive care outside the ICU
- 4.11. Supervision and delegation of duties and responsibilities to others

Self-governance

- 4.12. Understanding of the responsibilities for safe patient care
- 4.13. Formulation of clinical decisions with respect for ethical and legal principles
 - 4.13.1. Understanding of learning opportunities and integration of new knowledge into clinical practice.
 - 4.13.2. Medicolegal aspects of patient care – Medical negligence, human rights, withholding and withdrawing treatment in Indian setup.
- 4.14. Participation in multidisciplinary teaching
- 4.15. Participation in research or audit under supervision Participation in the team approach with respect for team members
- 4.16. Clinical governance

4. CLINICAL TRAINING:

Teaching and training of students shall include graded all round patient care responsibility including resuscitation, clinical diagnosis, invasive diagnostic and therapeutic procedures and advanced decision making in the management of critically sick

medical and surgical patients. The objective is to impart training so that the trainee will manage a “closed ICU”. As the intake of training is from diverse broad specialties, the following guidelines should be tailored for the requirement of the trainee.

To achieve these objectives, the resident doctors should be asked to spend their time in the following manner:

A. Twenty-four months in core discipline i.e. Intensive Care Units of the Department/Division of Critical Care Medicine.

As Paediatric Critical Care is distinct from Adult Critical Care, candidates from paediatric medicine may spend more time in Paediatric and neonatal ICU's, but they should be exposed to adult critical care for at least 1/3 of the prescribed time.

Of the 24 months in Core ICU rotation, they **should** spend time in

- a Neurosciences ICU (neurosurgical, neuro trauma and neurology) – 1 month
- b Cardiothoracic ICU – 1 month
- c Paediatric and Neonatal ICU – 2 weeks for non-paediatricians
- d Trauma ICU 1 month
- e Obstetric ICU - 1 month
- f Burns ICU® - 2 weeks

@ if patients from d, e and f specialties are not admitted in the main ICU's

If the department does not have the above specialties, the trainee should rotate through Intensive Care Units of other hospitals to cover up any deficiency in the required case-mix for the purpose of DM in CCM.

B. Maximum of 12 months of need-based rotation in other disciplines namely

- a. General Medicine – 2 Months (Mandatory except General Physicians)
- b. Anaesthesiology – 2 months (Mandatory except Anaesthetists)
- c. Infectious Disease – 1 Month
- d. Emergency Care and trauma - 1 month (optional for Emergency Physicians)
- e. Pulmonary Medicine – 1 month (Optional for Pulm Medicine)
 - a. Bronchoscopy
- f. Radiology – 2 weeks
- g. Cardiology – 2 weeks
 - a. Echocardiography
 - b. IABP
- h. Nephrology – 2 weeks
 - a. Renal replacement therapy
- i. Neurology – 2 weeks
 - a. Stroke unit
- j. Medical Gastroenterology – 2 weeks
 - a. including hepatology
- k. Endocrinology – 2 weeks
- l. Medical Oncology – 2 weeks
- m. Haematology – 2 weeks
 - a. Bone Marrow transplant

- n. Immunology - 2 weeks

The above rotations need to be tailored to the needs of individual trainees.

@ If an Anaesthesiologist wants to rotate in anaesthesia, for example to learn advanced airway skills like fiberoptic intubation or regional blocks, he should be allowed to do so.

- C. Rotation should be flexible and trainees should be given the opportunity to spend extra time within these 12 months in any specialty of their choice provided they complete the mandatory training.

5. SKILL TRAINING REQUIREMENT

1. Airway maintenance
 - i. Basic airway skills
 - ii. Advanced skills including video laryngoscopy and fiberoptic intubation
 - iii. Crici-thyroidotomy
 - iv. Percutaneous tracheostomy
 - v. Fiberoptic bronchoscopy
2. Imaging
 - a. Ultrasound:
 - i. Vascular access
 - ii. Lung
 - iii. FAST for trauma
 - iv. Intracranial pressure monitoring
 - v. Assessment of cerebral blood flow
 - b. Echocardiogram
 - i. Assessment in shock states
 - ii. Pericardial effusion
3. Vascular access
 - i. Arterial and venous including dialysis port
4. Lumbar puncture and epidural catheter placement
5. Insertion of intracranial pressure monitor
6. Insertion of tube thoracostomy
7. Bone marrow biopsy
8. Defibrillation
9. Seminars
10. Teaching Junior residents, allied health students and professionals
11. Use of simulation based skill training and teaching.

6. TEACHING METHODOLOGY

Teaching and learning methodology given below includes but not limited to Lecture, Discussion, Student Directed Learning, Case Based Learning etc.

1. Clinical Case Discussion
2. Morbidity-Mortality Discussion
3. Audit presentation

4. Lectures, Seminars and Journal Clubs
5. Presentation of progress report on the research projects
6. Simulation Laboratory
7. Joint inter-departmental academic meets with radiology, microbiology etc.
8. Departmental Clinical Meetings, Grand Rounds and Clinico-Pathological Meetings
9. Multi-departmental Combined Grand Rounds / Joint Academic Activities of the Institution.
10. Certification by Medical education (MCI approved) cell.

7. RESEARCH WORK

The candidates will be trained in the ability to

- Frame a research question
- Plan a study to answer the question
- Collect the relevant information and
- Evaluate appropriately the collected data to draw a conclusion.

The candidate should become conversant with the reporting of these results as a research paper, in journals and as a presentation in conferences.

The activities would consist of:

Planning and organizing relevant animal / clinical studies to be submitted as a dissertation at the end of the course.

Students should compulsorily attend the Research Methodology workshop conducted by the University within first six months of D.M. Course.

8. LOG BOOK

The Postgraduate student of a Postgraduate Degree Course in Super specialties shall maintain Log Book of the work carried out by them and the training programme undergone during the period of training including details of surgical operations assisted or done independently.

The Log Book shall be checked and assessed by the faculty members imparting the training.

Periodical evaluation of Log Book to be done by the Head of the Department as per 52nd SAB.

The Evaluation of the candidates in both theory and practical aspects will help the candidate in the improvement of his/her knowledge skills & attitude.

9. COMPETENCY ASSESSMENT

1. Communication / Commitment / Contribution / Compassion towards patients and Innovation
2. Implementation of Newly learnt techniques
3. Documentation of case sheets / discharge Summary / Review
4. Number of cases presented in Clinical Meetings/ Journal Clubs / Seminars / Papers presented in Conference.
5. No. Of Medals/ Certificates won in the conference / Quiz competitions and other academic meetings with details.

Assessment

- I- February - First Year
- II - August - First Year
- III - February - Second Year
- IV - August - Second Year
- V - February - Third Year
- VI - May - Third Year

VIVA INCLUDING COMPETENCY ASSESSMENT – 100 Marks (50+50)

*** The examiners shall peruse the records (log book) of the following components at the time of viva-voce examination to assess the performance of the candidates during their course of studies:**

- (i) Communication / Commitment / Contribution / Compassion towards patients and Innovation
- (ii) Implementation of Newly learnt techniques
- (iii) Documentation of case sheets / discharge Summary / Review
- (iv) Number of cases presented in Clinical Meetings/Journal Clubs / Seminars / Papers presented in Conference.
- (v) No. Of Medals/ Certificates won in the conference / Quiz competitions and other academic meetings with details.

*** This will be implemented from 2017-18 admission onwards. As resolved in the 55th meeting of Standing Academic Board held on 18.07.2018**

10. THEORY EXAMINATION

The examination should have two parts.

(D) Theory:

- o Four Papers of three hours each.

Each paper with two long question for 15 marks per questions and 7 short answer questions of 10 marks each.

$$100 \times 4 = 400$$

- o **Paper one:** Applied Basic medical Sciences. Anatomy, Physiology, Pharmacology, Bio-Chemistry, Microbiology, Pathology and physics.
- o **Paper two:** General Critical Care
- o **Paper three:** Specialised critical care
- o **Paper four:** Recent advances, ethics, and communication, administration and legal aspects.

11. CLINICAL EXAMINATION

Particulars	Time for candidate to examine the cases	Time for examiners to question the candidates	Maximum marks
Long case	1 case x 60 minutes	60 Minutes	100
Short Case	2 cases x 15 minutes	30 Minutes	100
Ward Rounds	3 patients x 10 minutes	30 Minutes	100
OSCE*	5 stations x 3 minutes	15 Minutes	50
Viva Voce	Communication, Research paper reading	15 Minutes	100
Log Book			50
Total			500

12. OSCE

*OSCE Stations:

1. Imaging – X-ray, CT scan, MRI
2. ECG and Blood Gas analysis
3. Ventilator graphics
4. Drugs and Equipments
5. Cardiopulmonary resuscitation

As per Medical Council of India Post Graduate Medical Education Regulations 2000 (amended upto 10th August 2016) clause 13.9 A Postgraduate student of a Postgraduate degree course in broad specialties / Super Specialties would be required to present one poster presentation to read one paper at a National / State conference and to present one Research paper which should be published / accepted for

publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate Degree Examination.

Apart from Poster / Oral paper presentation in National/ State Conferences, the Research paper published by the candidate in the University Journal of Medical Sciences will be considered as equivalent to the Research paper as mentioned in 13.9. clause. Case Reports can also be published in University Journal of Medical Sciences but case reports will not be considered as Research Paper. The candidate can also present Research Paper as per Clause 13.9 of Post Graduate Education Regulation 2000, and if the article sent for publication by the candidate as primary author or corresponding author which has not yet been published / accepted for publication, the candidate should submit a letter from the HOD, stating that the article sent for publication is of publishable merit and the proof of the Research Article submitted to the Journal for publication should be sent to the University forwarded through the HOD (as per 53rd SAB). The student can submit articles for the University journal anytime from the time of registration in the University till 6 months prior to theory examination.

13. TEXT BOOKS

- a. Critical Care 5th Edition – Civetta, Taylor and Kirby
- b. Oh's Intensive Care Manual – 7th Edition – Andrew D Bersten, Neil Soni
- c. Principles of Critical Care – 3rd Edition – Farokh Erach Udwadia
- d. Nunn's Applied Respiratory Physiology
- e. Clinical Application of Mechanical Ventilation – David W Chang
- f. Critical Care Nephrology - 3rd Edition – Ronco, Bellomo, Kellum, Ricci
- g. The Washington Manual of Critical Care - Marin H Kollef, Timothy J Bedient, Warren Isakow, Chand A Witt
- h. Critical Care Handbook of the Massachusetts General Hospital – 5th Edition
- i. Evidence based Critical Care – 3rd Edition Paul Ellis Marik
- j. Avoiding Common Anaesthesia Errors – Catherine Marcucci, Norman A Cohen, David G Metro, Jeffrey R Kirsch.

14. JOURNALS

- a. Critical Care Medicine
- b. Intensive Care Medicine
- c. Indian Journal of Critical Care Medicine
- d. Current opinion in critical care
- e. Current opinion in organ transplantation
- f. Anaesthesia and intensive care
- g. American journal of Respiratory and Critical care medicine
- h. New England Journal of Medicine
- i. Journal of the American Medical Association
- j. Circulation
- k. Neurology
- l. Critical Care Clinics
- m. Critical Care and Resuscitation
- n. British Journal of Anaesthesia

- o. Anaesthesia
- p. General of Trauma
- q. Canadian Journal of Anaesthesia

15. ONLINE RESOURCES

- a. Uptodate.com
- b. PACT module of the European Society of Intensive Care Medicine

M.Ch - CARDIO VASCULAR AND THORACIC SURGERY

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI
Syllabus – M.Ch. CARDIO VASCULAR AND THORACIC SURGERY

AIM & OBJECTIVE:

The syllabus for M.Ch., (Cardiovascular and Thoracic Surgery) Course should comprehensively cover all the subjects in Cardiovascular and Thoracic Surgery during 3 years of study period. The student who undergoes the course should have an exposure to all the facets of Cardiovascular and Thoracic Surgery and develop adequate knowledge and skill to treat the patients competently after acquiring the degree.

THEORY SYLLABUS

- Applied Anatomy and Developmental Anatomy of the chest wall, diaphragm; Pleura, Lungs, Mediastinum, Oesophagus, Heart, Pericardium, Great Vessels and its branches, Congenital Cardio-vascular and Thoracic anomalies.
- Applied Physiology – Respiration, Pulmonary function tests, Blood Pressure, Cardiac cycle, Cardiac output, Production of heart sounds and murmurs, Physiology of Extracorporeal Circulation and Hypothermia, Cardiac metabolism, Acid base balance, Fluid and Electrolytes Balance, Physiology of Oesophagus, Gastro Oesophageal reflux.
- Applied Pathology-- Thoracic injuries, Chest wall tumours, Emphysema, Pleural tumours, Pulmonary suppuration, Congenital anomalies of Great Vessels, Benign strictures of Oesophagus, Cancer of Oesophagus, Achalasia Cardia, Oesophagitis, Diaphragmatic hernia, Cardiac tumours, Pulmonary Embolism.
- Applied Bacteriology – Thoracic infection, Pulmonary infections, Bacterial and fungal endocarditis, infections during open heart surgery, intra thoracic infection and nosocomial infection / HIV in cardiac and pulmonary disease.
- Clinical examination and management including chest injuries, chest deformities and tumours of the chest wall.
- Infection of the pleura and tumours of the pleura.
- Pulmonary tuberculosis, lung abscesses, bronchiectasis, lung cysts and lung tumours, techniques and complication of pulmonary resections, mediastinal tumours.
- Congenital anomalies of Oesophagus.
- Foreign body in Oesophagus, Benign strictures of Oesophagus
- Peptic Oesophagitis, Hiatus Hernia, Cancer of Oesophagus and Diaphragmatic hernia.
- Diseases of the Pericardium, Myocardium and endocardium, Rheumatic heart

diseases, Diseases of the conducting system of the heart, coronary diseases. Congenital cyanotic and acyanotic heart disease. Syndromes associated with congenital heart disease. Aneurysm of great vessels / dissection.

- Detailed knowledge of the treatment of all cardiac, vascular and thoracic surgery problems.
- Detailed and technical knowledge of intra thoracic aortic diseases of varied Etiology
- Detailed knowledge of extra corporeal circulation and recent developments like ECMO.
- Detailed knowledge of Recent Advances in Cardiac Surgery – Heart Transplant, Heart Lung Transplant, Myocardial revascularization, Laser surgery, Robotic surgery – Computer Aided surgical developments – Genetic Engineering in Cardiac Disease Treatment, Total Artificial heart , Ventricular assist device, Stem Cell Research, Cardiac arrhythmia surgeries.
- Video assisted Thoracic Surgery:- Principles, Indications, Techniques and complications
- Minimally Invasive cardiac surgery.

Bioethics

1. Respect human life and the dignity of every individual
2. Refrain from supporting or committing crimes against humanity and condemn all such acts
3. Treat the sick and injured with competence and compassion and without prejudice and apply the knowledge and skills when needed.
4. Protect the privacy and confidentiality of those for whom we care and breach that confidence only when keeping it would seriously threaten their health and safety or that of others
5. Work freely with colleagues to discover, develop, and promote advances in medicine and public health that ameliorate suffering and contribute to human well being
6. Educate the public about present and future threats to the health of humanity
7. Advocate for social, educational and political changes that ameliorate suffering and contribute to human well being.
8. Teach and mentor those who follow us, for they are the future of our caring profession.

CLINICAL TRAINING

The students will be trained in parent department during the three year course. Postings in related departments will be as follows:

- 1) Cardiology –1 month
- 2) Vascular surgery--- 1 month
- 3) Other institutions (for advanced procedures) - 1 month

During II year, students are encouraged to undergo special postings for learning new advanced techniques / Procedure / Skills in institutions of higher repute where the requisite facilities are available without affecting the duties of the parent department.

SKILL TRAINING REQUIREMENTS

The student must have acquired certain surgical skills in a structured manner during the three year period of his course. These skills will be achieved by either assisting at the surgery or performing the surgery under the supervision of the teacher.

I year

Should have assisted at the following surgeries	Should have performed the following surgeries
Valve replacement/ repair	Sternotomy
Congenital heart surgery	Pleurocentesis
Coronary artery bypass grafting	Pericardiocentesis
LUNG resection	Intercostal Drainage
Decortication	Thoracotomy
Pericardectomy	Saphenous vein harvesting

II year

Should have assisted at the following surgeries	Should have performed the following surgeries
Beating heart Coronary artery bypass grafting	Atrial septal defect repair
Minimally invasive Cardiac surgery	Mitral Valve Replacement
Video- assisted Thoracic surgery	Proximal coronary anastomosis
Aneurysm repair	Bronchoscopy
	Internal mammary/Radial artery harvesting
	Traumatic lung injury repair

III year

Should have assisted at the following surgeries	Should have performed the following surgeries
Complex congenital heart surgery for Tetralogy of Fallot/ Transposition of Great Arteries	Aortic/ Double Valve Replacement
Bentall procedure	Distal coronary anastomosis
Multiple Valves Replacement	Lung resection
Redo Cardiac surgery	Decortication
	Vascular repair

TEACHING METHODOLOGY

1. Planning session with entire Faculty and students – once in a week
2. OP – 1 to 3 days/week
3. Ward rounds - 3 days/week
4. Per-operative teaching sessions - 2 days/week
5. Classroom lectures - thrice a week
6. Video teaching session - once in a week
7. Journal reading - once in a week
8. Symposium - once in a week
9. Guest lecture - once in 2 months
10. CME Program- once a month

RESEARCH WORK

- The candidate is introduced to the field of research in Cardiovascular and Thoracic surgery; both at clinical and laboratory level.
- The candidate will be trained in the ability to
 - Frame a research question.
 - Plan a study to answer the question.
 - Collect the relevant information and
 - Evaluate appropriately the collected data to draw a conclusion.
- The candidate should become conversant with the reporting of these results as a research paper, in journals and as a presentation in conferences.
- The activities would consist of:
 - Planning and organizing relevant studies to be submitted as a Research paper at the end of the course.
- Students should compulsorily attend Research Methodology workshop conducted by the University within first six months of M.Ch Course.

LOG BOOK:

The Postgraduate student of a Postgraduate Degree Course in Super specialties shall maintain Log Book of the work carried out by them and the training programme undergone during the period of training including details of surgical operations assisted or done independently by them.

The Log Book shall be checked and assessed by the faculty members imparting the training.

Periodical evaluation of Log Book to be done by the Head of the Department as per 52nd SAB.

The Evaluation of the candidates in both theory and practical aspects will help the candidate in the improvement of his/her knowledge skills & attitude.

COMPETENCY ASSESSMENT:

Overall:

1. Communication / Commitment / Contribution / Compassion towards patients and Innovation	-	10 Marks
2. Implementation of Newly learnt techniques	-	10 Marks
3. Documentation of case sheets / discharge Summary / Review	-	10 Marks
4. Number of cases presented in Clinical Meetings/ Journal Clubs / Seminars / Papers presented in Conference.	-	10 Marks
5. No. Of Medals/ Certificates won in the conference / Quiz competitions and other academic meetings with details.	-	10 Marks
Total		50 Marks

Assessment	I	- February	-	First Year
	II	- August	-	First Year
	III	- February	-	Second Year
	IV	- August	-	Second Year
	V	- February	-	Third Year
	VI	- May	-	Third Year

VIVA INCLUDING COMPETENCY ASSESSMENT – 100 Marks (50+50)

THEORY EXAMINATION

Paper I	Basic Sciences
Paper II	Thoracic and Cardiovascular Surgery I
Paper III	Thoracic and Cardiovascular Surgery II
Paper IV	Recent Advances in Cardiovascular and Thoracic Surgery

Each paper will Contain:

1. Essay questions (2)	-	2 X 15 =	30 Marks
2. Short Notes (10)	-	10 X 7 =	70 Marks
Total			100 Marks

CLINICAL EXAMINATION:

Particulars	Time for candidate to examine the cases	Time for examiners to question the candidates	Maximum Marks
Long Case	1 Case x 60 Minutes	60 Minutes	100
Short Case	2 Cases x 15 Minutes	30 Minutes	100
Ward Rounds	3 Patients x 10 Minutes	30 Minutes	100
OSCE	5 Stations x 3 Minutes	15 Minutes	50
Viva Voce		15 Minutes	100
Log Book			50
Total			500

As per Medical Council of India Post Graduate Medical Education regulations 2000 (amended upto 10th August 2016) clause **13.9, A Postgraduate student of a Postgraduate degree Course in broad specialties/ Super Specialties would be required to present one poster presentation to read one paper at a National/State conference and to present one Research paper which should be published/accepted for publication/sent for publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate Degree Examination.**

Apart from Poster/Oral paper presentation in National/State conferences, the Research paper published by the candidate in the University Journal of Medical Sciences will be considered as equivalent to the Research Paper as mentioned in 13.9. clause. Case Reports can also be published in University Journal of Medical Sciences but case reports will not be considered as Research Paper.

The candidate can also present Research Paper as per Clause 13.9 of Post Graduate Education Regulation 2000, and if the article sent for publication by the candidate as primary author or corresponding author which has not yet been published/accepted for publication, the candidate should submit a letter from the HOD, stating that the article sent for publication is of publishable merit and the proof of the Research Article submitted to the Journal for publication should be sent to the university forwarded through the HOD[as per 53rd SAB]

The student can submit articles for the University journal anytime from the time of registration till 6 months prior to theory examination.

OSCE: 5 stations

1. Clinical photograph of clinical scenario
2. Pathological specimen
3. Clinical photograph or video of Operative surgery

4. Radiological image- chest x-ray, CT scan, Angiogram
5. Surgical instruments and disposable items

REFERENCE BOOKS

- Surgery of the chest. Sabiston and Spencer
- Cardiac Surgery. Kirklin- Barrat Boyes
- Paediatric Cardiac Surgery. Constantine Mavroudis, Carl Backer
- Surgery for Congenital Heart defects. J. Stark, M. DeLeval
- Cardiac Surgery Operative Techniques. Doty and Doty
- Cardiopulmonary Bypass Principles and Practice. Glenn. Gravlee, Richard F. Davis, Joe R. Utley
- General Thoracic Surgery. Thomas W. Shields, Joseph Locicero, Ronald D. Ponn

****Note:** The editions are as applicable and the latest editions shall be the part of the syllabi.

JOURNALS

- Indian journal of thoracic and cardiovascular surgery
- The Annals of Thoracic surgery
- The journal of thoracic and cardiovascular surgery
- European journal of cardiothoracic surgery

M.Ch – NEURO SURGERY

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI

Syllabus - M.Ch. NEURO SURGERY

1.AIMS:

The syllabus for M.Ch.Neurosurgery course should comprehensively cover all the subjects pertaining to Basic Neurosciences, Clinical Neurology, Clinical Neurosurgery and Operative Neurosurgery.

2.OBJECTIVES:

To train and assess the candidate in

- a. Understanding of the neuroanatomical and neurophysiological basis of neurological disease
- b. Understanding of neuropathology of neurological disease
- c. Evaluating a patient with neurological symptoms
- d. Clinical examination of a patient with neurological symptoms and arriving at a clinical diagnosis
- e. Ordering appropriate investigations pertaining to possible differential diagnosis arrived at
- f. Ability to evaluate the neuroradiological and other investigations to arrive at a diagnosis
- g. Preoperative work up and planning
- h. Operative skills for basic neurosurgical procedures
- i. Postoperative management of the patient
- j. Management of patient at follow up with appropriate adjuvant therapy and investigations
- k. Formulate a research question, write a research proposal and carry out a prospective/retrospective study and publish its results

3.THEORY SYLLABUS:

There will be two streams:

- *6 years Course for post-MBBS candidates (General Surgery 1 year + Neurosurgery 5 years)*

- *3 years Course for post-MS (General Surgery) candidates*

The evaluation will be in **three** parts for the 6 years course with examinations as follows:

Part I: General Surgery at the end of the first year

Part II: Basic Neurosciences and Clinical Neurology at the end of the third year

Part III: Neurosurgery at the end of the sixth year

The evaluation will be in **one part** for the 3 years course, with examination being conducted at the end of three years.

The Candidates appearing for Part III Examination of 6 years M.Ch Neurosurgery course and 3 years M.Ch Neurosurgery post M.S course will have the same practical scheme of examination.

PART I (6 years course)

- Will undergo training in basic principles in General Surgery
- Will preferably be posted for at least 2 months in a Head and Neck Surgery unit for exposure to the anatomy of Head and Neck
- Will undergo an examination at the end of first year of the course in :
 - o Paper 1 – Basic Sciences in relation to General Surgery
 - o Paper 2 – General Surgery
- Will undergo Clinical and viva voce examination in General Surgery

PART II (6 years course)

Neuroanatomy

- Embryology of the nervous system
- Descriptive gross and microscopic anatomy
- Cross sectional anatomy relevant to interpretation of CT/MRI
- Microsurgical anatomy in relation to various operative approaches

Neurophysiology

- Physiology of intracranial pressure

- Physiology of motor, sensory systems and understanding the basis for clinical signs/symptoms in pathological states
- Physiology of autonomic nervous system
- Physiological basis for EEG, Evoked potentials and nerve conduction/Electromyography studies
- Interpretation of EEG/ Evoked potential studies

Neurochemistry

- General principles of Neurochemistry
- Neurotransmitters – Their distribution, synthesis and functions
- Neuroreceptors and their actions
- Biochemical changes in trauma and ischemia

Neuropathology

- Pathological changes in congenital, traumatic, inflammatory, infectious and neoplastic illnesses of the central and peripheral nervous system
- Latest WHO classification of brain tumours and their clinical relevance
- Basic molecular classification of brain tumours and their clinical relevance
- Basic knowledge of principles of immunohistochemistry and its role in classification of brain neoplasms
- Bacteriology, Virology and Parasitology with reference to common neurological infections

Neuropharmacology

- Will acquire knowledge of pharmacokinetics of the following agents and should be able to outline the indications, dosages and common side effects of
 - o Anti epileptics
 - o Analgesics
 - o Anti oedema agents
 - o Drugs used in Parkinson's disease
 - o Common agents used for sedation and anaesthesia
 - o Antipsychotic agents

- o Chemotherapeutic agents used in Neuro oncology
- o Common antibiotics and anti tuberculous agents
- o Anticoagulants, antiplatelet agents and thrombolytics
- o IV contrast agents

Clinical Neurology

- History taking and detailed clinical neurological examination of a patient with a neurological symptom, including patients in altered sensorium
- Interpretation of the clinical signs elicited in arriving at a clinical diagnosis
- Skill to distinguish neurosurgical illnesses from illnesses that may mimic a neurosurgical condition
- Concept of Brain death and its significance
- Interpretation of plain Xrays of the skull and spine as well as CT/MRI of brain and spine
- Adequate hands-on experience in performing
 - o Lumbar Puncture
 - o External ventricular drainage
 - o Invasive monitoring of intracranial pressure
 - o Transcranial Doppler
 - o Nerve conduction study and electromyography
 - o Electrode placement for monitoring evoked potentials and EEG
- Will undergo a theory examination at the end of three years of the 6 year course in
 - Paper I : Neuroanatomy and Neurophysiology
 - Paper II: Neurochemistry and Neuropathology
 - Paper III: Clinical Neurology
- Will undergo Clinical and Viva voce examinations in Clinical Neurology at the end of three years of the 6 year course.

The syllabus listed above (Part II) will be completed in two years i.e. during the second and third year of the 6 year course and the first two years of the 3 year course. There will be two months posting in the Neurology Unit during this period.

It is recommended that there be an additional 15 days posting in a Clinical Neurophysiology laboratory during the third year of the 6 year course and second year of the 3 year course.

PART III (6 year course)

There will be no set syllabus for this part. The candidate appearing for this part is expected to have a thorough knowledge of all the aspects covered above in Part II and in addition the following:

- History of neurosurgery especially its development in India
- Recent advances and Basic research methods in Neurosurgery
- Principles behind the working of operating microscope, Laser, Ultrasonic aspirator, Endoscopy, stereotaxy, neuronavigation and any newer developments in operative adjuncts used in the operating room
- Basic principles and techniques of radiation therapy in relation to neurosurgery, including radiosurgery
- Basic principles in diagnostic and interventional neuroradiology
- Acquaintance with recent neurosurgical literature and critically evaluate a journal article
- Basic operative skills
- Skills in decision making in common scenarios after neurosurgical operations

The examiners shall also bear in mind in the evaluation of the results of the Part-III examination whether the candidate is of such high merit as to be able to teach and train other neurosurgeons in course of time and whether his skill, knowledge, clinical acumen and surgical judgement is of such high order that decisions and management regarding neurosurgically ill patients can be entrusted safely to him.

The candidates will have at least one month posting in neurosurgical centres other than the one they are training in and two weeks each in Radiodiagnosis and Radiotherapy.

The final examination (Part III for six year course) will have two theory papers. The examination for 3 year course will have four theory papers, details of which are provided in the last section. Clinical and viva voce examinations will also be conducted.

Bioethics

1. Respect human life and the dignity of every individual.
2. Refrain from supporting or committing crimes against humanity and condemn all such acts.
3. Treat the sick and injured with competence and compassion and without prejudice and apply the knowledge and skills when needed.
4. Protect the privacy and confidentiality of those for whom we care and breach that confidence only when keeping it would seriously threaten their health and safety or that of others.
5. Work freely with colleagues to discover, develop, and promote advances in medicine and public health that ameliorate suffering and contribute to human well being.
6. Educate the public about present and future threats to the health of humanity.
7. Advocate for social, economic, educational and political changes that ameliorate suffering and contribute to human well being.
8. Teach and mentor those who follow us, for they are the future of our caring profession.

4. CLINICAL TRAINING

- Training on patient evaluation, decision making and management will be inculcated during day-to-day management of patients in the ward, emergency department and operating room
- The candidate will spend at least one month in one or more neurosurgical centres other than the college where they are training in.
- Two weeks each in Radiodiagnosis and Radiotherapy.

- During II year, students are encouraged to undergo special postings for learning new advanced techniques / Procedure / Skills in institutions of higher repute where the requisite facilities are available without affecting the duties of the parent department.

5.SKILL TRAINING

At the end of third year of 6 year course OR first year of 3 year course

Should have assisted the following	Should have performed the following
Craniotomies Decompressive craniectomies Laminectomies Anterior cervical approaches	Suturing scalp lacerations Opening and closure of the scalp Craniotomy using multiple burr holes and gigli saw Ventriculoperitoneal shunt insertion Evacuation of chronic subdural haematoma Lumbar subarachnoid drain insertion External ventricular drain insertion Application of skull traction

At the end of six year of 6 year course OR third year of 3 year course

Should have assisted the following	Should have performed the following
All skull base and vascular procedures including aneurysm clipping Excision of superficial and deep seated intra axial and extra axial brain tumours Excision of brain tumours in	Decompressive craniectomies Excision of low grade glioma/convexity meningioma on the surface in non eloquent regions Excision of brain abscess Lumbar and cervical discectomy Laminectomy for spinal tumours

eloquent location Excision of spinal cord tumours Spine instrumentation	Releasing CSF from cisterns for tumours (under supervision)
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6.TEACHING METHODOLOGY

- Ward rounds, case presentations and discussions
- Combined academic sessions with Neurologists
- Periodic audits of surgical cases will be conducted to expose the postgraduate resident to various aspects of management of cases such as complications and their avoidance and to evaluate outcomes
- Periodic inter departmental meetings will be conducted to train the patient in recent developments in Radiology, Radiation therapy and Rehabilitation
- Interdepartmental meetings with other specialities such as Radiology, Radiation Therapy, PMR and Endocrinology
- Weekly journal club
- Review of progress of thesis and other research work once in six months
- Teaching undergraduates and paramedical staff
- Participation in workshops and conferences
- Training in use and maintenance of equipments

7.RESEARCH WORK

- The candidate will be trained to acquire the skill to
 - Frame a research question
 - Devise a methodology to answer the question
 - Collect the relevant information and analyse it
 - Evaluate appropriately the collected data to draw a conclusion
- The candidate should become conversant with the reporting of these results as a research paper, in journals and as a presentation in conferences.

The activities to fulfil the above objectives would consist of

- Planning and organizing relevant animal / clinical studies to be submitted as a dissertation at the end of the course.

Students should attend Research Methodology workshop within first 6 months, M.Ch Course conducted by the University.

8. LOG BOOK:

Logbook showing the details of neurosurgical procedures assisted and performed, journal club presentations, attendances in conferences and workshops, paper presentations and publications periodically signed by the faculty at the level of Associate professor or above should be produced at the time of Clinical and Oral Examination.

The Postgraduate student of a Postgraduate Degree Course in Super specialties shall maintain Log Book of the work carried out by them and the training programme undergone during the period of training including details of surgical operations assisted or done independently by.

The Log Book shall be checked and assessed by the faculty members imparting the training.

Assessment of both theory and practicals at the end of every unit / posting.

9. COMPETENCY ASSESSMENT:

Overall:

1. Communication / Commitment / Contribution / Compassion towards patients and Innovation	-	10 Marks
2. Implementation of Newly learnt techniques	-	10 Marks
3. Documentation of case sheets / discharge Summary / Review	-	10 Marks
4. Number of cases presented in Clinical Meetings/ Journal Clubs / Seminars / Papers presented in Conference.	-	10 Marks
5. No. Of Medals/ Certificates won in the conference / Quiz competitions and other academic meetings with details.	-	10 Marks
Total		50 Marks

For 3 years M.Ch. Neurosurgery:

- Assessment I - February - First year
- II - August - First year
- III - February - Second Year
- IV - August - Second year
- V - February - Third Year
- VI - May - Third Year

For 6 years M.Ch. Neurosurgery:

- Assessment I - February - First year
- II - August - First year
- III - February - Second Year
- IV - August - Second year
- V - February - Third Year
- VI - August - Third Year
- VII - February - Fourth year
- VIII - August - Fourth year
- IX - February - Fifth year
- X - August - Fifth year
- XI - February - Sixth year
- XII - May - Sixth year

Note: Competency Assessment mark for 6th year student will be added only at the end of 6 years with Final year examination.

VIVA INCLUDING COMPETENCY ASSESSMENT – 100 Marks (50+50)

10. THEORY EXAMINATION:

M.Ch. (Neurosurgery) Six years course (for post-MBBS candidates)

Each theory paper will be for 100 marks.

Part I: General Surgery: At the end of 1st year

Theory

Paper I : Applied Basic Sciences in relation to General Surgery

Paper II : General Surgery

Practicals (Scheme for M.Ch. Neuro Surgery Six years – PART- I)

Particulars	Time for candidate to examine the cases	Time for examiners to question the candidates	Maximum Marks
Long Case	1 Case x 60 Minutes	60 Minutes	30
Short Case	2 Cases x 15 Minutes	30 Minutes	40 (20x2)
Ward Rounds	2 Patients x 5 Minutes	10 Minutes	20 (10x2)
OSCE	2 STATIONS	10 Minutes each	10(5x2)
Oral			100

Part II: Basic Sciences in Neurology and Clinical Neurology: At the end of 3rd year

Theory

Paper I : Neuroanatomy and Neurophysiology

Paper II: Neurochemistry and Neuropathology

Paper III : Clinical Neurology

Practicals (Scheme for M.Ch. Neuro Surgery Six years – PART- II)

Particulars	Time for candidate to examine the cases	Time for examiners to question the candidates	Maximum Marks
Long Case	1 Case x 60 Minutes	60 Minutes	100
Short Case	2 Cases x 15 Minutes	30 Minutes	100
Ward Rounds	3 Patients x 10 Minutes	30 Minutes	100
Viva Voce		15 Minutes	50
OSCE	5 Stations x 3 Minutes	15 Minutes	50
			400

Part III: Neurosurgery: At the end of 6th year

Theory

Paper I : Neuroradiology and Clinical Neurosurgery

Paper II : Operative Neurosurgery and Recent advances

Practicals

Practicals (Scheme for M.Ch. Neuro Surgery Six years – PART- III)

Particulars	Time for candidate to examine the cases	Time for examiners to question the candidates	Maximum Marks
Long Case	1 Case x 60 Minutes	60 Minutes	100
Short Case	2 Cases x 15 Minutes	30 Minutes	100
Ward Rounds	3 Patients x 10 Minutes	30 Minutes	100
OSCE	5 Stations x 3 Minutes	15 Minutes	50
Viva Voce		15 Minutes	100
Log Book			50
			500

Clinical Examination and Ward Round in Neurosurgery Oral Examinations in Neuroradiology and Neurosurgery.

Periodical Evaluation of Log Book and Dissertation/Thesis

“13. 9 A postgraduate student of a postgraduate degree course in broad specialities/Super specialities would be required to present one poster presentation, to read one paper at a national/state conference and to present one research paper which should be published/accepted for publication/sent for publication during the period of his postgraduate studies so as to make him eligible to appear at the postgraduate degree examination.”

Further it was resolved that the candidates should submit the **dissertation** at the end of VI year, i.e., 6 months prior to the Theory examination.

Regarding to evaluation of the dissertation, the dissertation evaluation shall be as approved or not approved. There will be no marks for the dissertation.

M.Ch. (Neurosurgery) Three years course (for post-MS candidates)

There will be a single examination at the end of three years.

Theory

Paper I: Neuroanatomy, Neurophysiology, Neurochemistry and Neuropathology

Paper II : Clinical Neurology

Paper III : Neuroradiology and Clinical Neurosurgery

Paper IV: Operative Neurosurgery and Recent advances

Practicals

Clinical and Oral Examinations in Neurosurgery

Periodical Evaluation of Log Book.

11.CLINICAL EXAMINATION:

Particulars	Time for candidate to examine cases	Time for examiners to question candidate	Maximum marks
Long case	1 case x 60 minutes	60 minutes	100
Short case	2 cases x 15 minutes each	30 minutes	100
Ward rounds	3 patients x 10 minutes	30 minutes	100
OSCE	5 stations x 3 minutes each	15 minutes	50
Viva voce		15 minutes	100
Log book		15 minutes	50
Total			500

13.9 A Postgraduate student of a Postgraduate degree Course in broad specialties/Super Specialties would be required to present one poster presentation to read one paper at a National/State conference and to present one Research paper which should be published/accepted for publication/sent for publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate Degree Examination.

Apart from Poster/Oral paper presentation in National/State conferences, the Research paper published by the candidate in the University Journal of Medical Sciences will be considered as equivalent to the Research Paper as mentioned in 13.9. clause. Case Reports can also be published in University Journal of Medical Sciences but case reports will not be considered as Research Paper.

The candidate can also present Research Paper as per Clause 13.9 of Post Graduate Education Regulation 2000, and if the article sent for publication by the candidate as primary author or corresponding author which has not yet been published/accepted for publication, the candidate should submit a letter from the HOD, stating that the article sent for publication is of publishable merit and the proof of the Research Article submitted to the Journal for publication should be sent to the university forwarded through the HOD [as per 53rd SAB]

The student can submit articles for the University journal anytime from the time of registration till 6 months prior to theory examination.

12.OSCE (5 stations):

1. Operative Surgery - Photograph x 3
2. Clinical Photograph
3. Counselling of a patient for a major surgical intervention

13.REFERENCE BOOKS:

1. Carpenter's Human Neuroanatomy
2. Kandell and Schwartz. Essentials of Neuroscience
3. Ganong. Medical Physiology
4. Plum & Posner's Diagnosis of stupor and coma
5. Dejong's Neurological Examination
6. Youman's Neurological Surgery
7. Schmidek and Sweet. Operative Neurosurgical Techniques Volumes 1 and 2.
8. Rhoton's Cranial Anatomy and Surgical Approaches
9. Benzel's Spine Surgery Volumes 1 and 2.
10. www.neurosurgicalatlas.com

****Note:** The editions are as applicable and the latest editions shall be the part of the syllabi.

14.JOURNALS

Neurology India

Journal of Neurosurgery

Journal of Neurosurgery: Spine

Journal of Neurosurgery: Pediatrics

World Neurosurgery

Neurosurgical Focus

Neurosurgery

British Journal of Neurosurgery

M.Ch - PLASTIC AND RECONSTRUCTIVE SURGERY

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI
Syllabus – M.Ch. Plastic and Re-constructive Surgery

AIMS&OBJECTIVES

The syllabus for M.Ch.(Plastic and Re-constructive Surgery) Course should comprehensively cover all the subjects in Plastic and reconstructive surgery during 3 years of study period. The student who undergoes the course should have an exposure to all the facets of plastic and reconstructive surgery and develop adequate knowledge and skill to treat the patients competently after acquiring the degree.

THEORY SYLLABUS

General Principles:-

1. History of Plastic Surgery and its broad scope at the present time.
2. Anatomy and functions of skin.
3. Split Skin Grafts and Full thickness Skin Grafts, their take and effects
4. Local skin flaps.
5. Pedicled skin flaps and tubed flaps.
6. Unstable scar and scar contracture.
7. Care of wounds, dressing, techniques and splints.
8. Wound healing.
9. Grafts – fat, fascia, tendon, nerve, cartilage, bone.
10. Infective skin gangrene.
11. Hospital infections.
12. Suture materials.
13. Surgical instruments.
14. Implant materials used in Plastic Surgery.
15. Principles of genetics and general approach to the management of congenital malformations.
16. Flaps-Fasciocutaneous muscle, musculocutaneous, osseocutaneous, free flaps.
17. Pre fabricated, Prelaminated, Chimeric flaps.
18. Local anaesthesia, nerve blocks, regional anaesthesia.
19. Principles of anaesthesia for infants, adults, hypothermia, hypotensive anaesthesia.
20. Tissue expansion.

21. Keloid, hypertrophic scars.
22. Endoscopy in Plastic Surgery.

Face:-

1. Growth and development changes in face, anatomy of facial skeleton.
2. Deformities of face in Hansen's disease.
3. Temporomandibular joint dysfunctions.
4. Fractures- nose, maxilla, mandible, zygoma, orbit-early management and treatment of sequelae.
5. Corrective Rhinoplasty.
6. Reconstructive Rhinoplasty.
7. Facial paralysis.
8. Reconstruction of external ear.
9. Reconstruction of eyelids, ptosis.
10. Congenital deformities of face and jaw bone.
11. Reconstruction of the lips.
12. Reconstruction of the scalp and calvarial defects.
13. Reconstruction of orbit.
14. Hemifacial atrophy.

Cleft Lip and Palate and Craniofacial Anomalies:-

1. Embryology of head and neck (excluding Central Nervous System).
2. Regional anatomy of head and neck.
3. Embryogenesis of cleft lip and palate.
4. Cleft lip and palate, alveolar clefts.
5. Velopharyngeal incompetence.
6. Orthodontics, speech therapy in cleft lip and palate.
7. Principles of craniofacial surgery.
8. Rare craniofacial clefts, Tessier's clefts.
9. Craniosynostosis, hypertelorism, craniofacial microsomia.

Tumours of Head and Neck and Skin:-

1. Vasoformative lesions of the skin and adenexa.
2. Jaw tumours.
3. Tumours of upper Aerodigestive system and Reconstruction.
4. Reconstruction of mandible.
5. Reconstruction of maxilla.

6. Malignant and benign tumours of head and neck.
7. Tumours of skin.
8. Principles of prosthetic replacement of Jaw defects.

Trunk:-

1. Reconstruction of full thickness defects of the abdomen and thorax.
2. Decubitus ulcer.
3. Breast reconstruction.
4. Reconstruction of defects over the spine.
5. Reconstruction of defects of Perineum.

Aesthetic Surgery:-

1. Chemical peeling and dermabrasion.
2. Blepharoplasty.
3. Face lift.
4. Abdominoplasty.
5. Body contouring, liposuction.
6. Reduction mammoplasty.
7. Augmentation mammoplasty.
8. Laser therapy.
9. Aesthetic Rhinoplasty.
10. Hair transplantation.
11. Fat grafting.
12. Botulinum toxin injection.
13. Skin needling.
14. Dermal fillers.
15. Gynaecomastia management.
16. Orthognathic Surgery.

Lower Extremity:-

1. Functional anatomy of foot.
2. Lymphedema.
3. Reconstructive surgery of lower extremity.
4. Deformities of leg and foot in Hansen's disease.
5. Diabetic Foot.

Genito Urinary:-

1. Embryology of the male and female external genitalia.
2. Anatomy of the male and female external genitalia.
3. Hypospadias.
4. Epispadias and ectopic vesicae.
5. Reconstruction of external genitalia.
6. Vaginoplasty.
7. Trans-sexualism (intersex).
8. Gender Reassignment Surgery.

Hand:-

1. Embryology of upper extremity.
2. Functional anatomy of hand.
3. Examination of hand.
4. General principles of hand surgery.
5. Treatment of acute hand injuries.
6. Finger tip injuries.
7. Flexor tendon injuries.
8. Extensor tendon injuries.
9. Principles of reconstruction in mutilating hand injuries.
10. Fractures of hand and dislocation of hand –metacarpals, phalanges.
11. Nail injuries, grafting.
12. Pollicisation.
13. Thumb reconstruction.
14. Peripheral nerve injuries, electro diagnostic tests.
15. Brachial plexus injury.
16. Innervated flaps.
17. Vascular malformations of upper extremity.
18. Lymphedema in upper extremity.
19. Compartment syndrome & Volkmann ischaemic contracture.
20. Ischaemic conditions of upper extremity.
21. Vasospastic conditions of upper extremity.
22. Nerve compression syndromes.
23. Surgery for spastic and tetraplegic hand.
24. Problems of small joints.
25. Dupuytren's disease.
26. Principles and treatment of old and neglected hand deformities.

27. Rheumatoid arthritis of hand.
28. Hand infections.
29. Congenital deformities of hand, finger, thumb.
30. Tendon transfers for radial, ulnar and median nerve injury.
31. Deformities of hand in Hansen's disease.
32. Benign and malignant tumours of hand.
33. Rehabilitation of hand, prosthesis.

Microvascular:-

1. Principles of microsurgery and its applications in plastic surgery.
2. Replantation and revascularization surgery.
3. Microvascular tissue transfers.
4. Composite Tissue Allotransplantation.

Burns:-

1. Thermal burns.
2. Electrical burns.
3. Chemical burns.
4. Radiation burn.
5. Pathophysiology of burn shock.
6. Nutrition in burns.
7. Facial burns.
8. Tangential excision and sequential excision.
9. Surgical reconstruction in Burns and its sequelae.
10. Burn wound infections and sepsis.
11. Principles of planning in event of burn disaster.
12. Organization of Burns Unit.
13. Skin Bank.

Bioethics

1. Respect human life and the dignity of every individual
2. Refrain from supporting or committing crimes against humanity and condemn all such acts
3. Treat the sick and injured with competence and compassion and without prejudice and to apply knowledge and skills when needed.
4. Protect the privacy and confidentiality of those for whom we care and breach that confidence only when keeping it would seriously threaten their

- health and safety or that of others
5. Work freely with colleagues to discover, develop, and promote advances in medicine and public health that ameliorate suffering and contribute to human well being
 6. Educate the public about present and future threats to the health of humanity
 7. Advocate for social, economic, educational and political changes that ameliorate suffering and contribute to human well being.
 8. Teach and mentor those who follow us, for they are the future of our caring profession.

CLINICAL TRAINING

The students will be clinically trained in parent department during the 3 years course.

Postings for 6 weeks at MCI Recognised centres for M.Ch. Plastic Surgery with more advanced management.

1. Burns: 2 weeks
2. Hand Surgery: 2 weeks
3. Facio-maxillary surgery: 2 weeks.

During II year, students are encouraged to undergo special postings for learning new advanced techniques / Procedure / Skills in institutions of higher repute where the requisite facilities are available without affecting the duties of the parent department.

SKILL TRAINING:

The student must have acquired certain surgical skills in a structured manner during the three year period of his course. These skills will be achieved by either assisting at the surgery or performing the surgery under the supervision of the teacher.

I year

Should have assisted at the following surgeries	Should have performed the following surgeries
Distant flaps	Skin grafting
Facial bone fracture fixation	Scar revision / Z plasty
Surgery for Burns Reconstruction	Wound dressing techniques

Management of Gynaecomastia Regional flaps Hand injury management – nerve, tendon repairs, hand bones fracture fixation	Local flaps
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II year

Should have assisted at the following surgeries	Should have performed the following surgeries
Tissue expansion surgery Reconstruction of defects on eyelids/nose/lip Microtia surgery Cleft lip and palate repair Post-oncological reconstruction with pedicled flaps Tendon transfer surgeries Replantation surgery – hand and fingers Reconstruction procedures on breast	Distant flaps Facial bone fracture fixation Surgery for Burns Reconstruction Management of Gynaecomastia Regional flaps Hand injury management nerve, tendon repairs, hand bones fracture fixation

III year

Should have assisted at the following surgeries	Should have performed the following surgeries
Hypospadias surgery Nerve surgery for Facial nerve paralysis Genital surgery Aesthetic surgery Microvascular Free flaps Brachial Plexus surgery	Tissue expansion surgery Reconstruction of defects on eyelids/nose/lip Microtia surgery Cleft lip and palate repair Post oncological reconstruction with pedicled flaps Tendon transfer surgeries Replantation surgery – hand and fingers Reconstruction procedures on breast

TEACHING METHODOLOGY

1. Planning session with entire Faculty and students – once in a week
2. OP clinics – 2 days/week
3. Ward rounds - 2 days/week
4. Wound care clinics - 2 days/week
5. Per-operative teaching sessions - 2 days/week
6. Classroom lectures - once in a week
7. Video teaching session - once in a week
8. Journal reading - once in a week
9. Symposium - once in a week
10. Guest lecture - once in 6 months

RESEARCH WORK

The candidate is introduced to the field of research in Plastic and reconstructive surgery; both at clinical and laboratory level.

The candidate will be trained in the ability to

- Frame a research question.
- Plan a study to answer the question.
- Collect the relevant information and
- Evaluate appropriately the collected data to draw a conclusion.

The candidate should become conversant with the reporting of these results as a research paper, in journals and as a presentation in conferences.

The activities would consist of:

Planning and organizing relevant studies to be submitted as a Research paper at the end of the course.

Students should compulsorily attend Research Methodology workshop conducted by the University within first six months of M.Ch Course.

LOG BOOK:

The Postgraduate student of a Postgraduate Degree Course in

Super specialties shall maintain Log Book of the work carried out by them and the training programme undergone during the period of training including details of surgical operations assisted or done independently by.

The Log Book shall be checked and assessed by the faculty members imparting the training.

Periodical evaluation of Log Book to be done by the Head of the Department as per 52nd SAB.

The Evaluation of the candidates in both theory and practical aspects will help the candidate in the improvement of his/her knowledge skills & attitude.

COMPETENCY ASSESSMENT:

Overall:

1. Communication / Commitment / Contribution / Compassion towards patients and Innovation	-	10 Marks
2. Implementation of Newly learnt techniques	-	10 Marks
3. Documentation of case sheets / discharge Summary / Review	-	10 Marks
4. Number of cases presented in Clinical Meetings/ Journal Clubs / Seminars / Papers presented in Conference.	-	10 Marks
5. No. Of Medals/ Certificates won in the conference / Quiz competitions and other academic meetings with details.	-	10 Marks
Total		50 Marks

Assessment	I	- February	-	First Year
	II	- August	-	First Year
	III	- February	-	Second Year
	IV	- August	-	Second Year
	V	- February	-	Third Year
	VI	- May	-	Third Year

VIVA INCLUDING COMPETENCY ASSESSMENT – 100 Marks (50+50)

THEORY EXAMINATION

Paper I - Basic Sciences and General Principles in Plastic Surgery
Paper II - Plastic Surgery – Regional
Paper III - Plastic Surgery - Applied
Paper IV - Plastic surgery as Applied to Allied Sciences and Recent
Advances in Plastic Surgery

Each Paper will contain

1. Essay questions (2) - 2 X 15 = 30 Marks
2. Short Notes (10) - 10 X 7 = 70 Marks

Total 100 Marks

PRACTICAL SCHEME:

Particulars	Time for candidate to examine the cases	Time for examiners to question the candidates	Maximum Marks
Long Case	1 Case x 60 Minutes	60 Minutes	100
Short Case	2 Cases x 15 Minutes	30 Minutes	100
Ward Rounds	3 Patients x 10 Minutes	30 Minutes	100
OSCE	5 Stations x 3 Minutes	15 Minutes	50
Viva Voce		15 Minutes	100
Log Book			50
Total			500

As per Medical Council of India Post Graduate Medical Education Regulations 2000 (amended upto 10th August 2016) clause **13.9**
A Postgraduate student of a Postgraduate degree Course in broad specialties/ Super Specialties would be required to present one poster presentation to read one paper at a National/State conference

and to present one Research paper which should be published/accepted for publication/sent for publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate Degree Examination.

Apart from Poster/Oral paper presentation in National/State conferences, the Research paper published by the candidate in the University Journal of Medical Sciences will be considered as equivalent to the Research Paper as mentioned in 13.9. clause. Case Reports can also be published in University Journal of Medical Sciences but case reports will not be considered as Research Paper.

The candidate can also present Research Paper as per Clause 13.9 of Post Graduate Education Regulation 2000, and if the article sent for publication by the candidate as primary author or corresponding author which has not yet been published/accepted for publication, the candidate should submit a letter from the HOD, stating that the article sent for publication is of publishable merit and the proof of the Research Article submitted to the Journal for publication should be sent to the university forwarded through the HOD [as per 53rd SAB]

The student can submit articles for the University journal anytime from the time of registration till 6 months prior to theory examination.

OSCE: 5 stations

1. Clinical photograph of clinical scenario
2. Clinical photograph of clinical scenario
3. Clinical photograph or video of Operative surgery
4. Photograph of Recent Advances in Plastic Surgery or Equipment used in Plastic surgery
5. Photograph of Rehabilitation aids

REFERENCE BOOKS

1. Paediatric Burns-Total Management of the Burned Child by Marella L Hanumadass and K Mathangi Ramakrishnan
2. Grabb and Smith – Plastic Surgery
3. Mc Gregor: Fundamental Techniques of Plastic Surgery
4. Plastic Surgery by Peter C. Neligan
5. Green's Operative Hand Surgery

****Note:** The editions are as applicable and the latest editions shall be the part of the syllabi.

JOURNALS

1. BJPS: British Journal of Plastic Surgery
2. PRS: Plastic and Reconstructive Surgery
3. IJPS: Indian Journal of Plastic Surgery
4. JHS: Journal of Hand Surgery
5. Journal of Reconstructive Microsurgery

M.Ch - UROLOGY

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI
Syllabus - M.Ch - UROLOGY

1.AIMS & OBJECTIVES

The syllabus for M.Ch., Urology course should comprehensively cover all the subjects in urology and renal transplantation during 3 years of study period. The student who undergoes the course should have an exposure to all the facets of urology and transplantation and develop adequate knowledge and skill to treat the patients competently after acquiring the degree.

2. THEORY SYLLABUS

It will cover a wide spectrum of the diseases of the urogenital system, retroperitoneum and renal transplantation

Apart from the clinical aspect of these subjects, the candidate has to acquire in depth knowledge of the related basic subjects like applied anatomy, physiology, biochemistry, pharmacology, pathology, microbiology, epidemiology, immunology etc.

1. Anatomy and embryology of GU tract, adrenal & retroperitoneum.
2. Applied physiology and biochemistry pertaining to Urology, Nephrology, renal transplantation and renovascular hypertension.
3. Investigative urology & Genito-urinary radiology and imaging including nuclear medicine.
4. Male Infertility, Andrology and Urological endocrinology.
5. Sexual dysfunction-investigation and management
6. Perioperative care, management of urological complications and care of the critically ill patients.
7. Urodynamics and Neurology.
8. Genito-Urinary trauma.
9. Urolithiasis-Medical, Biochemical & Surgical aspects.
10. Uro-Oncology-Adult & Paediatric.

11. Reconstructive Urology.
12. Paediatric Urology-congenital malformations and acquired diseases.
13. Urinary tract infections and sexually transmitted diseases.
14. Obstructive Uropathy.
15. Renal transplantation (including transplant immunology medical & surgical aspects)
16. Renovascular Hypertension.
17. Gynaecological urology.
18. Newer developments in Urology.
19. Operative Urology – Open and endoscopic.
20. Endourology.
21. Behavioural and social aspects of urology.
22. Neonatal problems in urology.
23. Electrocoagulation, lasers, fibre optics, instruments, Catheters, endoscopes etc.
24. Retroperitoneal Diseases & Management.
25. Medical aspects of the kidney diseases.
26. Laparoscopic Urologic Surgery.
27. Robotic Urologic Surgery

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

1. Biostatistics & Epidemiology.
2. Computer Sciences.
3. Experimental and Research methodology and Evidence Based Medicine.

4. Scientific presentation.
5. Cardio-pulmonary resuscitation.
6. Ethics in medicine.

Bioethics

1. Respect human life and the dignity of every individual.
2. Refrain from supporting or committing crimes against humanity and condemn all such acts.
3. Treat the sick and injured with competence and compassion and without prejudice and apply the knowledge and skills when needed.
4. Protect the privacy and confidentiality of those for whom we care and breach that confidence only when keeping it would seriously threaten their health and safety or that of others.
5. Work freely with colleagues to discover, develop, and promote advances in medicine and public health that ameliorate suffering and contribute to human well being.
6. Educate the public about present and future threats to the health of humanity.
7. Advocate for social, economic, educational and political changes that ameliorate suffering and contribute to human well being.
8. Teach and mentor those who follow us, for they are the future of our caring profession.

Urological Jurisprudence

Comprehensive knowledge of urological jurisprudence including informed consent consumer protection act, organ transplantation act, medical record keeping laws relating male and female sterilization etc.

3. CLINICAL TRAINING

The Students will be clinically trained in parent department during the 3 years course.

0-6 Months

A candidate is required to perform the following procedures.

1. Cystourethroscopy, dilatation, retrograde uretero - pyelography, interpretation of normal and abnormal findings in relation to gross inflammation, obstructive and neoplastic changes in the lower urinary tract.
- Interpretation of flow rate.
- Optical urethrotomy, insertion and retrieval of ureteric stents.

2. Minor Urological Procedures :

Needle biopsy of the prostate, dilatation, trocar cystostomy, open cystostomy, orchiectomy, circumcision, meatotomy / meatoplasty.

3. Uro -Radiological & Imaging Techniques :

During this period a candidate should perform various uroradiological and Imaging procedures like Retrograde Urethrograms & Micturating cystourethrogram, cystogram, nephrostogram, sonogram, antegrade pyelography.

Learn interpretation of intra venous urogram, Ultrasound & Computerized tomography' scans and Isotope renogram and, renal angiography.

Attain familiarity with Shock wave Lithotripsy, perform and interpret urodynamic studies.

Various tests of sexual dysfunction such as pharmacologically induced penile erection and dynamic cavernosography.

6 – 23 Months

The candidate shall assist and perform following procedures.

(a)Endoscopic Surgery :

Bladder Neck Incision, Litholopaxy, cystolithotripsy, ureteral meatotomy, endoscopic suspension of bladder neck, Transurethral resection of Prostate and bladder tumour; ureteroscopy.

(b) Open surgical procedures :

Simple nephrectomy, radical nephrectomy, cystolithotomy, ureterolithotomy, Pyelolithotomy, extended pyelolithotomy, pyeloplasty, retropubic and transvesical prostatectomy, orchiopexy, partial and total amputation of penis, ureteric reimplantation VVF repair, A.V. Fistula (radial), harvesting Buccal mucosa, , Inguinal lymph node dissection, Blandy's urethroplasty. Bed preparation Renal Transplantation.

(c) All Urological Emergencies:

Percutaneous Nephrostomy, Cystoscopy and double DJ stenting, Trocar SPC diversion, open supra pubic cystostomy, Renal injuries, Ureteric injuries, bladder injuries, urethral injuries, penile injuries, torsion testis, fracture penis.

24 – 36 Months

a) Endoscopic surgery

PCNL

Laparoscopic procedures

Simple nephrectomy, radical nephrectomy, pyeloplasty, ureterolithotomy

b) Open Surgery

Perform

Substitution urethroplasty, progressive perineal urethroplasty. Hypospadias repair, Boari flap, augmentation cystoplasty, Urinary diversion, ureteroneocystostomy, radical cystectomy, nephroureterectomy, brachial AV fistulae

Assist

Exstrophy closure, epispadias repair, posterior urethral valve fulguration, Penile prosthesis, artificial urinary sphincter, Microsurgical vasoepididymostomy, and vasovasostomy.

Post chemotherapy retroperitoneal lymphadenectomy, nephron sparing surgery, radical prostatectomy, neobladder.

Renal transplantation.

Laparoscopic pyeloplasty, laparoscopic partial nephrectomy.

RIRS.

During II year, students are encouraged to undergo special postings for learning new advanced techniques / Procedure / Skills in institutions of higher repute where the requisite facilities are available without affecting the duties of the parent department.

4. SKILL TRAINING REQUIREMENTS

ENDOSCOPIC SURGERY

1. Endoscopies	100
2. Optical Urethrotomy	30
3. TURP	20
4. TURBT	10
5. Ureteroscopy	30
6. PCNL	5
7. Laparoscopic Urological Procedures	10

OPEN SURGERY

1. Nephrectomy	5
2. Pyelolithotomy	5
3. Pyeloplasty	5
4. Radical Nephrectomy	5
5. VVF Repair	4
6. Radical Cystectomy	1
7. Ileal conduit	3
8. Partial Penectomy	5
9. Total Penectomy	3
10. Varicocele Ligation	5
11. Ileo inguinal block dissection	2
12. Substitution Urethroplasty	5
13. Anastamotc Urethroplasty	2
14. Meatoplasty	10
15. Ureteric reimplantation	5
16. Assisting Transplant Surgery	5
17. Hypospadias repair	2

5.TEACHING METHODOLOGY

Besides didactic lectures (delivered by the faculty members, national and international visiting teachers,) seminar, symposium and journal clubs have to be organized.

Problem oriented training to be given in the form of case discussions, ward rounds, inter-disciplinary meetings and department statistical meetings, Practical training is to be imparted by full time residency training programme, where a trainee will be given full responsibility of the patients.

Course Training

As it is a fulltime residency programme the candidate will be responsible for the total care of the patients. The candidate will be encouraged to improve and develop his decision-making ability under supervision to make independent decisions.

Every day, there will be at least one hour academic activity to a maximum of 10 hours/week in which all the faculty members and residents will participate. Case discussions will take place weekly with a final year resident as a moderator.

Other academic activities like journal clubs, seminars, group discussions statistical meetings , will be a fortnightly feature. Morbidity and mortality meetings where operations, complications, deaths will be carried

out monthly. Emergency will only be attended by the on call residents.

Consultations given to other departments should also be discussed every morning with the respective consultants. In OPD a candidate will see the cases independently and will make all the pertinent notes. In problematic cases and a special referral, it is mandatory to show the case to the respective consultant.

A candidate will have to attend all postmortem examinations done for the department.

Interdepartmental meetings like uroradiology, uronephrology, uroradiotherapy & medical oncology, uro pathology, uroimaging will provide an opportunity for open discussion on a common subject and it will also provide an opportunity to learn views of the specialists on these subjects.

Theory examination will be conducted once in six months from first year onwards.

Model practical examinations will be conducted at the end of the course.

6. RESEARCH WORK

Mandatory attendance of manuscript writing workshops.

1. Basic knowledge of clinical research methods, biostatistics, epidemiology and ethics.
2. Basic knowledge of cell biology, molecular biology, molecular genetics and immunology
3. Critical analysis of current literature, ability to formulate research questions, make a study design, calculate sample size, data management, ways to avoid bias etc.
4. Preparation of proposals for funding and evaluation by institutional review boards
5. Presentation of work in written/oral form at conferences
6. Publication of the work in peer review journals.

Students should compulsorily attend Research Methodology workshop conducted by the University within first six months of M.Ch Course.

It is desirable that the candidate should spend time for basic research in collaboration with a basic science department i.e.

biochemistry, and pathology.

7.LOG BOOK:

The Postgraduate student of a Postgraduate Degree Course in Super specialties shall maintain Log Book of the work carried out by them and the training programme undergone during the period of training including details of surgical operations assisted or done independently.

The Log Book shall be checked and assessed by the faculty members imparting the training.

Periodical evaluation of Log Book to be done by the Head of the Department as per 52nd SAB.

The Evaluation of the candidates in both theory and practical aspects will help the candidate in the improvement of his/her knowledge skills & attitude.

8. COMPETENCY ASSESSMENT:

Overall:

1. Communication / Commitment / Contribution / Compassion towards patients and Innovation	-	10 Marks
2. Implementation of Newly learnt techniques	-	10 Marks
3. Documentation of case sheets / discharge Summary / Review	-	10 Marks
4. Number of cases presented in Clinical Meetings/ Journal Clubs / Seminars / Papers presented in Conference.	-	10 Marks
5. No. Of Medals/ Certificates won in the conference / Quiz competitions and other academic meetings with Details.	-	10 Marks
Total		50 Marks

Assessment	I	- February	-	First Year
	II	- August	-	First Year
	III	- February	-	Second Year
	IV	- August	-	Second Year
	V	- February	-	Third Year
	VI	- May	-	Third Year

VIVA INCLUDING COMPETENCY ASSESSMENT – 100 Marks (50+50)

9.THEORY EXAMINATION

Paper I - Basic Sciences Applied to Urology
Paper II - General Adult and Pediatric Urology
Paper III - Regional Systemic Urology
Paper IV - Recent Advances in Urology

Each paper will contain:

1. Essay questions (2) - 2 X 15 = 30 Marks

2. Short Notes (10) - 10 X 7 = 70 Marks

Total -----
100 Marks

10. CLINICAL EXAMINATION:

Particulars	Time for candidate to examine the cases	Time for examiners to question the candidates	Maximum Marks
Long Case	1 Case x 60 Minutes	60 Minutes	100
Short Case	2 Cases x 15 Minutes	30 Minutes	100
Ward Rounds	3 Patients x 10 Minutes	30 Minutes	100
OSCE	5 Stations x 3 Minutes	15 Minutes	50
Viva Voce		15 Minutes	100
Log Book			50
			500

As per Medical Council of India Post Graduate Medical Education Regulations 2000 (amended upto 10th August 2016) clause **13.9 A Postgraduate student of a Postgraduate degree Course in broad specialties/Super Specialties would be required to present one poster presentation to read one paper at a National/State conference and to present one Research paper which should be published/accepted for publication/sent for publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate Degree Examination.**

Apart from Poster/Oral paper presentation in National/State conferences, the Research paper published by the candidate in the

University Journal of Medical Sciences will be considered as equivalent to the Research Paper as mentioned in 13.9. clause. Case Reports can also be published in University Journal of Medical Sciences but case reports will not be considered as Research Paper.

The candidate can also present Research Paper as per Clause 13.9 of Post Graduate Education Regulation 2000, and if the article sent for publication by the candidate as primary author or corresponding author which has not yet been published/accepted for publication, the candidate should submit a letter from the HOD, stating that the article sent for publication is of publishable merit and the proof of the Research Article submitted to the Journal for publication should be sent to the university forwarded through the HOD [as per 53rd SAB]

The student can submit articles for the University journal anytime from the time of registration till 6 months prior to theory examination.

11.OSCE:

1. Clinical Scenario - 2 stations
2. Operative Surgery - Video/Photograph
3. Clinical Photograph
4. Endoscopic Photograph
5. Pathology slide

12.REFERENCE BOOKS

General Urology

- 1.Campbell urology-3 Volumes Edited by Walgh, et al
- 2.Scientific Basis of Urology Mundy
- 3.Current Urological Therapy Kaufman
- 4.Obstructive Uropathy O'Reilly
- 5.Urogenital trauma Mcannich
- 7.Adult & Paediatric Urology Gillenwater et al

Paediatric Urology

Pediatric Urology Kelalis & King – 2 vol.

Urodynamics

Urodynamics principle & practice Mundy

Endourology

Endourology Arthur Smith

Renal Transplantation

Kidney transplantation Peter Morris

Operative Urology

- 1 Glen's operative urology
- 2 Atlas of urological surgery Hinman

****Note:** The editions are as applicable and the latest editions shall be the part of the syllabi.

13.JOURNALS

- ← Indian J. Urology
- ← European Urology
- ← Journal of Urology
- ← BJU international
- ← Urology (Gold Journal)
- ← Transplantation

Periodicals

- 1 Urological clinics of North America
- 2 Seminars in Urology

M.Ch - PAEDIATRIC SURGERY

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI
Syllabus - M.Ch - Paediatric Surgery

1. AIMS:

To train candidates in the practice of Paediatric surgery including basic medical sciences in the paediatric age group and in research methodology by a comprehensive and structured training program.

Assessment to be done at periodic intervals and at the end of the training period before being awarded the M.Ch degree.

2. OBJECTIVES:

At the end of training the candidate should

1. Have an understanding of the fundamental skills and principles of Paediatric surgery.
2. Have knowledge of the relevant basic medical and para clinical subjects.
3. Be able to diagnose common clinical problems in Paediatric surgery.
4. Be able to carry out pre-operative work up and post-operative management.
5. Be able to carry out resuscitative procedures and intervention in Paediatric surgical emergencies.
6. Be able to carry out independently a variety of surgical procedures in the specialty of Paediatric surgery, including endoscopic and laparoscopic procedures.
7. Be familiar with research methodology and experimental animal laboratory work.
8. Have knowledge of ventilators and practical knowledge of artificial ventilation.
9. Should be able to counsel the mothers diagnosed with fetal anomalies
10. Should be able to perform basic radiological procedures such as MCUG, Barium enema
11. They should be able to interpret ultrasound / CT / MRI pictures and urodynamic study.
12. To have a knowledge of Bio-ethics in clinical medicine and in research.

3. THEORY SYLLABUS (INCLUDING BIOETHICS):

(A) BASIC SCIENCES

1. ANATOMY

Surgical anatomy and embryology and embryo- pathology

- a) Gastrointestinal tract including rectum, liver, biliary tract and pancreas
- b) Respiratory system including diaphragm
- c) Genito - urinary tract, including descent of testes and sexual differentiation.
- d) Lymphatic system
- e) Face, neck and branchial apparatus
- f) Abdominal wall, umbilicus and inguinal canal
- g) Vertebral column and central nervous system restricted to gross anatomy & developmental anomalies

2. PHYSIOLOGY AND BIOCHEMISTRY

- 1. Physiology of fetus
- 2. Physiology of the new born, including antenatal period
- 3. Gastrointestinal physiology including deglutition, esophageal motility, anti-reflux mechanism, intestinal mobility & defecation, altered biochemistry in intestinal obstruction, hepatic function including bilirubin metabolism.
- 4. Physiology of urine excretion, micturition & biochemical changes in obstructive uro-pathy and renal failure.
- 5. Cardiovascular physiology including fetal & neonatal cardiac function
- 6. Fluid and electrolyte balance.
- 7. Haemolytic disorders
- 8. Nutritional requirements in health and disease including parenteral nutrition.
- 9. Sexual differentiation including biochemical aspects in anomalous conditions.

10. Physiological changes during pre-operative and post-operative period and changes during different types of anaesthesia
11. Respiratory system Respiratory failure
12. Acid Base balance

3. MICROBIOLOGY

- a) Pathophysiology of sepsis in neonates, infants and children, and inflammatory response.
- b) Maintenance of asepsis, sterility in newborn nursery, ward and operation theatre. Sterilisation of surgical instruments including endoscopes, Laparoscopes & ventilators.
- c) Common surgical infection, including osteomyelitis and septic arthritis.
- d) Surgical tuberculosis including atypical mycobacterial infection.
- e) AIDS - pathophysiology
- f) Hepatitis - pathophysiology
- g) Parasitic surgical conditions
- h) Elements of immunology including its importance in organ transplantation & immunosuppression.

(B) GENERAL TOPICS

1. Molecular genetics & gene therapy
2. Clinical genetics
3. Fetus as a patient; ultra sonography, MRI
4. Prenatal diagnosis, fetal surgery and fetal intervention.
5. Principles of paediatric anaesthesia
6. Paediatric intensive care management
7. Resuscitation, mechanical ventilation, ECMO
8. Pharmacology of commonly used drugs

9. Central venous access

(C) PAEDIATRIC TRAUMA

1. Birth trauma
2. Infants and children as accident victims & their assessment & management.
3. Thoracic injuries, abdominal trauma, genitourinary tract trauma, central nervous system injuries, musculo skeletal trauma.
4. Management of burns
5. Child abuse, recognition and management

(D) MAJOR TUMOURS IN CHILDREN

1. Principles of paediatric surgical, medical and radio - oncology
2. Wilms' tumour
3. Neuroblastoma
4. Liver tumours
5. Rhabdomyosarcomas
6. Teratomas & testicular tumor
7. Hodgkin's lymphoma and non-Hodgkin's lymphoma
8. Common bone tumours
9. Central nervous system tumours
10. Ovarian tumours

(E) TRANSPLANTATION

1. Principles of transplantation
2. Kidney transplantation
3. Liver transplantation
4. Pancreatic transplantation
5. Intestinal transplantation

6. Heart & Heart-lung transplantation

7. Bone marrow transplantation

(F) IMAGING TECHNIQUES

1. Ultrasonography, CT scan & MRI in paediatric surgery

2. Isotope imaging

(G) RECENT ADVANCES IN SURGICAL TECHNIQUES

1. Minimal invasive surgery including laparoscopic surgery

2. Laser, cryosurgery, robotic, telesurgery

3. Principles of endoscopy in the upper and lower G.I. tract, bronchial tree, genitourinary tract and fetoscopy.

(H) PAEDIATRIC SURGERY - REGIONAL

1. HEAD AND NECK

1. Cranio facial abnormalities; basic principles, cranio-facial clefts,
Cranial synostosis

2. Cleft lip and palate

3. Otolaryngologic disorders

4. Salivary glands

5. Lymph node disorders

6. Thyroid, para thyroid disorders

7. Cyst & sinuses of the neck

8. Torticollis

2. THORAX

1. Disorders of the breast

2. Congenital chest wall deformities

3. Congenital diaphragmatic hernia, eventration of the diaphragm
4. Mediastinal cyst and tumours
5. Laryngoscopy, bronchoscopy, thoracoscopy, oesophagoscopy
6. Lesions of larynx and trachea
7. Respiratory problems related to the air way and lung
8. Disorders of the thoracic cavity and pleura; infection of the lung, pleura and mediastinum.
9. Congenital Diaphragmatic Hernia and Eventration
10. Tumours of the lung
11. Congenital anomalies of the oesophagus
12. Oesophageal rupture
13. Caustic stricture of oesophagus
14. Replacement of oesophagus
15. Achalasia cardia
16. Gastro oesophageal reflux
17. Vascular rings

3. ABDOMEN

1. Disorders of the umbilicus , Meckel's diverticulum & urachus
2. Abdominal wall defects
3. Inguinal hernia & hydrocele
4. Undescended testis, torsion and varicocele
5. Hypertrophic pyloric stenosis
6. Peptic ulcer disease
7. Duodenal stenosis and atresia
8. Jejuno ileal stenosis and atresia

9. Meconium ileus & meconium peritonitis
10. Intussusception
11. Intestinal malrotation & disorders of fixation
12. Other causes of intestinal obstruction
13. Short bowel syndrome
14. Gastro intestinal endoscopy, laparoscopic surgery
15. Gastro intestinal bleed
16. Duplication of gut
17. Mesenteric and omental cysts
18. Polypoidal disease of gastro intestinal tract
19. Necrotizing enterocolitis
20. Ascites
21. Crohn's disease and ulcerative colitis
22. Peritonitis
23. Stomas of small and large intestine
24. Stenosis, atresia & other obstructions of colon
25. Appendicitis
26. Hirschsprung's disease
27. Anorectal malformations
28. Pouch colon syndrome
29. Colorectal tumors
30. Biliary atresia
31. Choledochal cysts
32. Gall bladder disease and hepatic infection
33. Non malignant tumours of liver

- 34. Portal hypertension
- 35. Pancreatitis & other disorders of pancreas
- 36. Splenic disorders
- 37. Adrenal gland lesions

4. GENITOURINARY TRACT

- 1. Renal Agenesis, dysplasia and cystic disease
- 2. Renal fusion & ectopia
- 3. Pelvi ureteric obstruction
- 4. Vesico ureteral reflux, urinary lithiasis and renal vein thrombosis
- 5. Ureteral duplications & ureterocele
- 6. Mega ureter & prune belly syndrome
- 7. Urinary diversion
- 8. Disorders of bladder function
- 9. Bladder augmentation
- 10. Bladder exstrophy and epispadias
- 11. Hypospadias
- 12. Abnormalities of urethra, penis and scrotum.
- 13. Ambiguous genitalia in the new born

Bioethics

- 1. Respect human life and the dignity of every individual.
- 2. Refrain from supporting or committing crimes against humanity and condemn all such acts.
- 3. Treat the sick and injured with competence and compassion and without prejudice and apply the knowledge and skills when needed.
- 4. Protect the privacy and confidentiality of those for whom we care and breach that confidence only when keeping it would seriously threaten their health and safety or that of others.

5. Work freely with colleagues to discover, develop, and promote advances in medicine and public health that ameliorate suffering and contribute to human well being.
6. Educate the public about present and future threats to the health of humanity.
7. Advocate for social, economic, educational and political changes that ameliorate suffering and contribute to human well being.
8. Teach and mentor those who follow us, for they are the future of our caring profession.

4. CLINICAL TRAINING:

The students will be clinically training in parent department during the 3 years course.

1. Active participation of the candidate in attending outpatient department, ward rounds, regular operating work, emergency operating work and involvement in pre and postoperative care.
2. Involvement in radiological diagnosis and management including ultrasound, CT scan, MRI and contrast studies
3. Involvement in counselling patients and their parents
4. Two months postings in Institutions of higher repute with more advanced management.
5. Genitourinary surgery including Renal transplant -1 month
6. Surgical Gastroenterology including Liver, Pancreatic and intestinal transplant- 1 month.

During II year, students are encouraged to undergo special postings for learning new advanced techniques / Procedure / Skills in institutions of higher repute where the requisite facilities are available without affecting the duties of the parent department.

5. SKILL TRAINING REQUIREMENTS:

(A) Operative areas of Training

The student must have acquired certain surgical skills in a structured manner during the three year period of course.

1st Year – Assisting in minor and major operative procedures under guidance of

teachers.

2nd Year – As above and performing independent minor surgical procedures

3rd Year- Independent major surgical /operative work under supervision of
Teachers

The following number of surgical cases should be assisted /operated by each candidate during the 3 year training program:

- | | |
|--|------------|
| 1. Indexed neonatal surgical cases/procedures | - 50 to100 |
| 2. General Paediatric surgical cases/procedures | - 50 to100 |
| 3. Paediatric gastro - intestinal surgical cases/ Procedures | - 50 to100 |
| 4. Paediatric urological cases/procedures | - 50 to100 |
| 5. Paediatric thoracic surgical cases/procedures | - 25 to 50 |
| 6. Paediatric oncology cases/procedures | - 20 |
| 7. Paediatric Plastic surgery cases/procedures | - 50 |
| 8. Paediatric neurosurgical cases/procedures | - 50 |
| 9. Paediatric endoscopic procedures | - 50 |
| 10.Paediatric Laparoscopic and Thoracoscopic procedures | - 50 |

NOTE: The number of cases mentioned are merely guide lines and are desirable but not mandatory.

B.Non-operative areas of Training:

The non-operative component of the structured M.Ch. training program in paediatric surgery is also equally important and should include:-

1. Basics of Ultrasonography
2. Technique of Resuscitation of the Newborn
3. PALS and NALS
4. ATLS
5. Antenatal diagnosis and counselling (intervention if possible)
6. Orientation with Internet and the Computer technology
7. Management of Day care Surgery
8. Paediatric Transplantation (Liver,Kidney,Pancreas)
9. Surgical Embryology,genetics and the gene therapy

10. Paediatric Chemotherapy regimens for solid tumours
11. Problems of babies with prematurity and small for date physiology of the Newborn and the drug schedules for the newborn, and the Blood exchange transfusions.
12. Organisational capabilities to host conferences, Symposia, workshops etc.
13. Membership of National and International Paediatric Surgical associations.
14. Subscribing to the established journals in the speciality.
15. Knowledge about the progress made in Paediatric Surgery during the Past few decades: Transplants, Endoscopy, Lasers, Laparoscopy, Tumormarkers, antenatal diagnosis, genetherapy.
16. Regenerative Medicine & Stem Cell Therapy.
17. Knowledge in Bioethics -the standards, principles, and rules of conduct that govern physician behaviour and the practice of medicine. To inform and guide the resolution of moral dilemmas as they arise in patient care and within the broad context of societal healthcare. Informed consent, Withholding and Withdrawal of Life-Sustaining Treatment, Multiculturalism, Surgical errors.

6. TEACHING METHODOLOGY

1. OP clinics as per unit admission days.
2. Ward rounds once a week.
3. Classroom lectures once a week.
4. Oncology meets once a week/month.
5. Radiology meets once a week/month.
6. Journal club once a week.
7. Paediatric surgical meet once in 2 months.
8. Lab. training –endotrainer and (simulation lab subject to availability).
9. Symposium once in three months.

- 10.Surgical clinics once in a year.
- 11.Guest and in-house lectures. Conferences, seminars and CME's.
- 12.Participation in workshops, etc.
- 13.Teaching undergraduates / postgraduates / paramedical staff.
- 14.Weekly Surgical audit (patient care review meeting).
- 15.Biomedical equipments use and maintenance.

7. RESEARCH WORK:

The candidate will be trained in the ability to

Frame a research question.

Plan a study to answer the question.

Collect the relevant information and

Evaluate appropriately the collected data to draw a conclusion.

The candidate should become conversant with the reporting of these results as a research paper, in journals and as a presentation in conferences.

Students should compulsorily attend Research Methodology workshop conducted by the University within first six months of M.Ch Course.

8. LOG BOOK:

The Post graduate should maintain a logbook, in which the operative procedures assisted or performed should be recorded, along with pathological reports/outcome & complications.

The Postgraduate student of a Postgraduate Degree Course in Super specialties shall maintain Log Book of the work carried out by them and the training programme undergone during the period of training including details of surgical operations assisted or done independently.

The Log Book shall be checked and assessed by the faculty members imparting the training.

Periodical evaluation of Log Book to be done by the Head of the Department as per 52nd SAB.

The Evaluation of the candidates in both theory and practical aspects will help the candidate in the improvement of his/her knowledge skills & attitude.

9. COMPETENCY ASSESSMENT:

Overall:

1. Communication / Commitment / Contribution / Compassion towards patients and Innovation	-	10 Marks
2. Implementation of Newly learnt techniques	-	10 Marks
3. Documentation of case sheets / discharge Summary / Review	-	10 Marks
4. Number of cases presented in Clinical Meetings/ Journal Clubs / Seminars / Papers presented in Conference.	-	10 Marks
5. No. Of Medals/ Certificates won in the conference / Quiz competitions and other academic meetings with Details.	-	10 Marks
Total		----- 50 Marks -----

Assessment I	-	February	-	First year
II	-	August	-	First year
III	-	February	-	Second Year
IV	-	August	-	Second year
V	-	February	-	Third Year
VI	-	May	-	Third Year

VIVA INCLUDING COMPETENCY ASSESSMENT – 100 Marks (50+50)

10. THEORY EXAMINATION

Paper I	Basic Sciences applied to Paediatric Surgery
Paper II	Neonatal Surgery and Paediatric Genito - Urinary Surgery
Paper III	Regional and Systemic Paediatric Surgery

Paper IV Recent Advances in Paediatric Surgery

Each paper will contain:

1. Essay questions (2)	-	2 X 15	=	30 Marks
2. Short Notes (10)	-	10 X 7	=	70 Marks
Total				----- 100 Marks -----

11. CLINICAL EXAMINATION:

Particulars	Time for candidate to examine the cases	Time for examiners to question the candidates	Maximum Marks
Long Case	1 Case x 60 Minutes	60 Minutes	100
Short Case	2 Cases x 15 Minutes	30 Minutes	100
Ward Rounds	3 Patients x 10 Minutes	30 Minutes	100
OSCE	5 Stations x 3 Minutes	15 Minutes	50
Viva Voce		15 Minutes	100
Log Book			50
			500

“13.9 A Postgraduate student of a Postgraduate degree Course in broad specialties/Super Specialties would be required to present one poster presentation to read one paper at a National/State conference and to present one Research paper which should be published/accepted for publication/sent for publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate Degree Examination”.

Apart from Poster/Oral paper presentation in National/State conferences, the Research paper published by the candidate in the University Journal of Medical Sciences will be considered as equivalent to the Research Paper as mentioned in 13.9. clause. Case Reports can also be published in University Journal of Medical Sciences but case reports will not be considered as Research Paper.

The candidate can also present Research Paper as per Clause 13.9 of Post Graduate Education Regulation 2000, and if the article sent for publication by the candidate as primary author or corresponding author which has not yet

been published/accepted for publication, the candidate should submit a letter from the HOD, stating that the article sent for publication is of publishable merit and the proof of the Research Article submitted to the Journal for publication should be sent to the university forwarded through the HOD [as per 53rd SAB]

The student can submit articles for the University journal anytime from the time of registration till 6 months prior to theory examination.

12. OSCE : 5 stations

1. Embryology/Anatomy/ Pathology
2. Instruments – operative surgery, complications- prevention and management
3. Radiology
4. Clinical photograph
5. Counselling – Antenatal , counselling on major diseases and procedures

13. REFERENCE BOOKS:

S.No	Title	Editors	Publisher
1	Pediatric Surgery – seventh edition	Arnold G. Coran	
2	The Kelalis–King–Belman Textbook of Clinical Pediatric Urology	Steven G Docimo MD	Informa Healthcare UK Ltd
3	Newborn Surgery	Professor Prem Puri	Hodder & Stoughton Ltd
4	Operative Pediatric Surgery	Lewis Spitz , Arnold G Coran	Taylor & Francis Group, LLC
5	Anorectal Malformations in Children Embryology, Diagnosis, Surgical Treatment, Follow-up	Alexander M. Holschneider · John M. Hutson	Springer Berlin Heidelberg
6	Atlas of Endoscopic Major Pulmonary Resections	Dominique Gossot	Springer Berlin Heidelberg

7	Endoscopic Surgery in Infants and Children	Klaas (N) M.A. Bax Keith E. Georgeson	Springer Berlin Heidelberg
8	Hirschsprung's Disease and Allied Disorders	A. M. Holschneider · P. Puri	Springer Berlin Heidelberg
9	Operative Endoscopy and Endoscopic Surgery in Infants and Children	Azad Najmaldin	Hodder Arnold
10	Hinman's atlas of Pediatric urologic surgery	Frank Hinman , Jr.,	Saunders,
11.	Monograph –Hirschsprungs disease		
12	Monograph – Anorectal Anomaly		
13	Monograph – Oesophageal atresia TEF		

****Note:** The editions are as applicable and the latest editions shall be the part of the syllabi.

14. JOURNALS:

- i) Journal of Paediatric surgery
- ii) Paediatric surgery International
- iii) European Journal of Paediatric surgery
- iv) Journal of Paediatric Urology
- v) Journal of Indian Association of Paediatric Surgeons
- vi) Indian Pediatrics
- vii) Seminars in Pediatric Surgery

M.Ch - SURGICAL ONCOLOGY

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI
Syllabus - M.Ch. SURGICAL ONCOLOGY

1 AIMS & OBJECTIVES:

The syllabus of the 3-year MCh Surgical oncology training programme is designed to:

1. Impart knowledge and skills training to a qualified surgeon in all aspects of cancer treatment, so that he becomes competent to treat cancer patients after acquiring the degree.
2. Train him/her in diagnostic and therapeutic procedures including the fundamentals of medical and radiation oncology, basic sciences, cancer prevention, screening, rehabilitation and palliative care so that he/she can provide comprehensive cancer care to the patients.
3. Make him/her an accomplished teacher for training the students.
4. Make him/her well-versed in conducting clinical research and trials in the field of oncology.
5. Enable and encourage the student to publish papers in indexed journals and participate in National and International Meetings/Conferences in the field.

2 .THEORY SYLLABUS:-

SECTION - I - ETIOLOGY OF CANCER

1. THE CANCER GENOME

- Cancer Genes and their Mutations
- Identification of Cancer Genes
- Somatic Alteration Classes Detected by Cancer Genome Analysis
- Pathway-Oriented Models of Cancer Genome Analysis
- Networks of Cancer Genome Projects
- The Genomic Landscape of Cancers
- Integrative Analysis of Cancer Genomics
- The Cancer Genome and the New Taxonomy of Tumors
- Cancer Genomics and Drug Resistance
- Perspectives of Cancer Genome Analysis

2. HALLMARKS OF CANCER: AN ORGANIZING PRINCIPLE FOR CANCER MEDICINE

- Hallmark Capabilities, in Essence

- Two Ubiquitous Characteristics Facilitate the Acquisition of Hallmark Capabilities
- The Constituent Cell Types of the Tumor Microenvironment
- Therapeutic Targeting of the Hallmarks of Cancer
- Conclusion and a Vision for the Future

3. MOLECULAR METHODS IN CANCER

- Applications of Molecular Diagnostics in Oncology
- The Clinical Molecular Diagnostics Laboratory: Rules and Regulations
- Specimen Requirements for Molecular Diagnostics
- Molecular Diagnostics Testing Process
- Technologies

4. TOBACCO

- Epidemiology of Tobacco and Cancer
- Carcinogens in Tobacco Products and Processes of Cancer Development

5. ONCOGENIC VIRUSES

- Principles of Tumor Virology
- Papillomaviruses
- Polyomaviruses
- Epstein-Barr Virus
- Kaposi's Sarcoma Herpesvirus
- Animal and Human Retroviruses
- Hepatitis Viruses

6. INFLAMMATION

- Molecular Basis of Inflammation
- Role of Inflammation in Transformation
- Role of Inflammation in Survival
- Role of Inflammation in Proliferation
- Role of Inflammation in Invasion
- Role of Inflammation in Angiogenesis
- Role of Inflammation in Metastasis
- Epigenetic Changes and Inflammation
- Role of Inflammation in Cancer Diagnosis
- Inflammation and Genomics
- Inflammation and Targeted Therapies

7. CHEMICAL FACTORS

- The Nature of Chemical Carcinogens: Chemistry and Metabolism
- Animal Model Systems and Chemical Carcinogenesis
- Molecular Epidemiology, Chemical Carcinogenesis, and Cancer Risk in Human Populations
- Aristolochic Acid and Urothelial Cancers as a Model for Identifying Human Carcinogens

8. PHYSICAL FACTORS

- Ionizing Radiation
- Ultraviolet Light
- Radiofrequency and Microwave Radiation
- Electromagnetic Fields
- Asbestos
- Nanoparticles

9. DIETARY FACTORS

- Methodologic Challenges
- The Role of Individual Food and Nutrients in Cancer Etiology
- Other Foods and Nutrients
- Dietary Patterns
- Diet During the Early Phases of Life
- Diet after a Diagnosis of Cancer
- Summary
- Limitations
- Future Directions

10. OBESITY AND PHYSICAL ACTIVITY

- Breast Cancer
- Colon and Rectal Cancer
- Endometrial Cancer
- Adenocarcinoma of the Esophagus
- Kidney/Renal Cell Cancer
- Pancreatic Cancer
- Gallbladder Cancer
- Non-Hodgkin Lymphoma
- Prostate Cancer
- Lung Cancer
- Ovarian Cancer

SECTION – II - EPIDEMIOLOGY OF CANCER

11. EPIDEMIOLOGIC METHODS

- Analytical Studies
- Interpretation of Epidemiologic Findings
- Cancer Outcomes Research
- Molecular Epidemiology

12. TRENDS IN UNITED STATES CANCER MORTALITY

- Cancer Surveillance Systems
- Making Sense of Cancer Trends
- Trends in Cancer Risk Factors and Screening
- Cancer Incidence and Mortality
- Predicting Future Cancer Trends

13. ESSENTIALS OF RADIATION THERAPY

- Biologic Aspects of Radiation Oncology
- Factors that Affect Radiation Response
- Drugs that Affect Radiation Sensitivity
- Radiation Physics
- Treatment Planning
- Other Treatment Modalities
- Clinical Applications of Radiation Therapy
- Treatment Intent
- Fractionation
- Adverse Effects
- Principles of Combining Anticancer Agents with Radiation Therapy

14. CANCER IMMUNOTHERAPY

- Human Tumor Antigens
- Human Cancer Immunotherapies

15. PHARMACOKINETICS AND PHARMACODYNAMICS OF ANTICANCER DRUGS

- Pharmacokinetic Concepts
- Pharmacodynamic Concepts
- Variability in Pharmacokinetics/Pharmacodynamics
- Dose-Adaptation Using Pharmacokinetic/Pharmacodynamic Principles

16. PHARMACOGENOMICS

- Pharmacogenomics of Tumor Response
- Pharmacogenomics of Chemotherapy Drug Toxicity
- Conclusions and Future Directions

17. ALKYLATING AGENTS

- Perspectives
- Chemistry
- Classification
- Clinical Pharmacokinetics/Pharmacodynamics
- Therapeutic Uses
- Toxicities
- Complications with High-Dose Alkylating Agent Therapy
- Alkylating Agent–Steroid Conjugates
- Drug Resistance and Modulation
- Recent Developments

18. PLATINUM ANALOGS

- History
- Platinum Chemistry
- Platinum Complexes after Cisplatin
- Mechanism of Action
- Cellular Responses to Platinum-Induced DNA Damage
- Is DNA the Only Target?
- Mechanisms of Resistance
- Clinical Pharmacology
- Formulation and Administration
- Toxicity

19. ANTIMETABOLITES

- Antifolates
- Fluoropyrimidines
- Capecitabine
- Cytarabine
- Gemcitabine
- Thiopurines
- Fludarabine
- Cladribine
- Clofarabine

20. TOPOISOMERASE INTERACTIVE AGENTS

- Classification, Biochemical, and Biologic Functions of Topoisomerases
- Topoisomerase Inhibitors as Interfacial Poisons
- Topoisomerase I Inhibitors: Camptothecins and Beyond
- Topoisomerase II Inhibitors: Intercalators and Nonintercalators
- Therapy-Related Secondary Acute Leukemia
- Future Directions

21. ANTIMICROTUBULE AGENTS

- Microtubules
- Taxanes
- Vinca Alkaloids
- Microtubule Antagonists
- Mitotic Motor Protein Inhibitors
- Mechanisms of Resistance to Microtubule Inhibitors

22. KINASE INHIBITORS AS ANTICANCER DRUGS

- Early Successes: Targeting Cancers with Well-Known Kinase Mutations (BCR-ABL, KIT, Her2)
- Directly Targeting the PI3K Pathway
- Combinations of Kinase Inhibitors to Induce Response and Prevent Resistance
- Speculations on the Future Role of Kinase Inhibitors in Cancer Medicine

23. HISTONE DEACETYLASE INHIBITORS AND DEMETHYLATING AGENTS

- Epigenetic Abnormalities and Gene Expression Changes in Cancer
- Histone Deacetylase Inhibitors
- Epigenetic Therapy for Hematologic Malignancies
- New Approaches to Epigenetic Therapy

24. PROTEASOME INHIBITORS

- Biochemistry of the Ubiquitin-Proteasome Pathway
- Proteasome Inhibitors
- Proteasome Inhibitors in Cancer

25. POLY (ADP-RIBOSE) POLYMERASE INHIBITORS

- Cellular DNA Repair Pathways
- The Development of PARP Inhibitors

- *BRCA1* and *BRCA2* Mutations and DNA Repair
- PARP-1 Inhibition as a Synthetic Lethal Therapeutic Strategy for the Treatment of BRCA-Deficient Cancers
- Initial Clinical Results Testing Synthetic Lethality of PARP Inhibitors and BRCA Mutation
- The Use of PARP Inhibitors in Sporadic Cancers
- Mechanisms of Resistance to PARP Inhibitors
- Prospects

26. MISCELLANEOUS CHEMOTHERAPEUTIC AGENTS

- Homoharringtonine and Omacetaxine
- L-Asparaginase
- Bleomycin
- Procarbazine
- Vismodegib
- Ado-Trastuzumab Emtansine
- Sirolimus and Temsirolimus
- Everolimus
- Thalidomide, Lenalidomide, and Pomalidomide

27. HORMONAL AGENTS

- Selective Estrogen Receptor Modulators
- Aromatase Inhibitors
- Gonadotropin-Releasing Hormone Analogs
- Gonadotropin-Releasing Hormone Antagonists
- Antiandrogens
- Novel Antiandrogens
- Other Sex Steroid Therapies
- Other Hormonal Therapies

28. ANTIANGIOGENESIS AGENTS

- Understanding the Angiogenic Process
- Drug Development of Angiogenesis Inhibitors
- Clinical Utility of Approved Antiangiogenic Agents in Cancer Therapy
- Combination Therapies
- Biomarkers of Antiangiogenic Therapy
- Resistance to Antiangiogenic Therapy

29. PHARMACOLOGY OF CANCER BIOTHERAPEUTICS MONOCLONAL ANTIBODIES

- Immunoglobulin Structure

- Modified Antibody-Based Molecules
- Factors Regulating Antibody-Based Tumor Targeting
- Unconjugated Antibodies
- Altering Signal Transduction
- Immunoconjugates
- Antibodies Approved for Use in Solid Tumors
- Antibodies Used in Hematologic Malignancies

30. ASSESSMENT OF CLINICAL RESPONSE

- Assessing Response
- Alternate Response Criteria
- Determining Outcome

PART IV CANCER PREVENTION AND SCREENING

31. TOBACCO USE AND THE CANCER PATIENT

- Neurobiology of Tobacco Dependence
- Tobacco Use Prevalence and the Evolution of Tobacco Products
- Tobacco Use by the Cancer Patient
- The Clinical Effects of Smoking on the Cancer Patient
- Addressing Tobacco Use by the Cancer Patient
- Future Considerations

32. ROLE OF SURGERY IN CANCER PREVENTION

- Patients at High Risk for Breast Cancer
- Hereditary Diffuse Gastric Cancer
- Surgical Prophylaxis of Hereditary Ovarian and Endometrial Cancer
- Hereditary Endometrial Cancer (Lynch Syndrome)
- Gynecologic Cancer Risk in Very Rare Hereditary Cancer Syndromes
- Multiple Endocrine Neoplasia Type 2
- Familial Adenomatous Polyposis, *MYH*-Associated Polyposis, and Lynch Syndrome

33. CANCER RISK-REDUCING AGENTS

- Why Cancer Prevention as a Clinical Oncology Discipline
- Defining Cancer Risk–Reducing Agents (Chemoprevention)
- Identifying Potential Cancer Risk–Reducing Agents
- Preclinical Development of Cancer Risk–Reducing Agents
- Clinical Development of Cancer Risk–Reducing Agents
- Micronutrients
- Anti-Inflammatory Drugs

- Epigenetic Targeting Agents (Selective Estrogen Receptor Modulators, 5 α -Steroid
- Reductase Inhibitors, Polyamine Inhibitors)
- Signal Transduction Modifiers
- Anti-Infectives
- Multiagent Approaches to Cancer Risk Reduction

34. CANCER SCREENING

- Performance Characteristics
- Assessing Screening Tests and Outcomes
- Problems with Randomized Trials
- Screening Guidelines and Recommendations
- Breast Cancer Screening
- Cancers of the Gastrointestinal Tract
- Gynecologic Cancer
- Lung Cancer Screening
- Prostate Cancer Screening
- Skin Cancer Screening

35. GENETIC COUNSELING

- Who is a Candidate for Cancer Genetic Counseling?
- Components of the Cancer Genetic Counseling Session
- Issues in Cancer Genetic Counseling
- Recent Advances and Future Directions

PART V PRACTICE OF ONCOLOGY

36. DESIGN AND ANALYSIS OF CLINICAL TRIALS

- Phase 1 Clinical Trials
- Phase 2 Clinical Trials
- Design of Phase 3 Clinical Trials
- Factorial Designs
- Analysis of Phase 3 Clinical Trials
- Reporting Results of Clinical Trials
- False Positive Reports in the Literature
- Meta-analysis

SECTION 1. CANCER OF THE HEAD AND NECK

37. Molecular Biology of Head and Neck Cancers

- Molecular Mechanisms in Head and Neck Squamous Cell Carcinoma
- The Cancer Genome Atlas Project

- Cancer Stem Cells

38. Cancer of the Head and Neck

- Incidence and Etiology
- Anatomy and Pathology
- Natural History
- Diagnosis
- Staging
- Principles of Treatment for Squamous Cell Carcinoma
- Management

NECK

- Chemotherapy
- General Principles of Combining Modalities
- Chemotherapy as Part of Curative Treatment
- Follow-Up

ORAL CAVITY

- Lip
- Floor of the Mouth
- Oral Tongue
- Buccal Mucosa
- Gingiva and Hard Palate (including Retromolar Trigone)
- Oropharynx
- Anatomy
- Pathology
- Patterns of Spread
- Clinical Picture
- Staging
- Treatment: Base of Tongue
- Results of Treatment: Base of Tongue
- Follow-Up: Base of Tongue
- Complications of Treatment: Base of Tongue
- Treatment: Tonsillar Area
- Results of Treatment: Tonsillar Area
- Complications of Treatment: Tonsillar Area
- Surgical Treatment
- Treatment: Soft Palate
- Results of Treatment: Soft Palate
- Complications of Treatment: Soft Palate

LARYNX

- Anatomy
- Pathology
- Patterns of Spread

- Clinical Picture
- Differential Diagnosis and Staging
- Treatment: Vocal Cord Carcinoma
- Treatment: Supraglottic Larynx Carcinoma
- Treatment: Subglottic Larynx Carcinoma
- Treatment: Supraglottic Larynx Cancer

HYPOPHARYNX: PHARYNGEAL WALLS, PYRIFORM SINUS, AND POSTCRICOID PHARYNX

- Anatomy
- Pathology
- Patterns of Spread
- Clinical Picture
- Staging
- Treatment
- Results of Treatment
- Complications of Treatment

NASOPHARYNX

- Anatomy
- Pathology
- Patterns of Spread
- Clinical Picture
- Staging
- Treatment
- Nasal Vestibule, Nasal Cavity, and Paranasal Sinuses
- Paragangliomas
- Major Salivary Glands
- Minor Salivary Glands

39. REHABILITATION AFTER TREATMENT OF HEAD AND NECK CANCER

- Pretreatment Counseling
- Support During Treatment and Rehabilitation of the Chemoradiation Patient
- Resources for Rehabilitation of Head and Neck Cancer Patients

SECTION 2. CANCER OF THE THORACIC CAVITY

40. MOLECULAR BIOLOGY OF LUNG CANCER

- Susceptibility to Lung Cancer: Genetic Susceptibility and Carcinogens in Tobacco Smoke
- Molecular Changes in Preneoplasia
- Genetic and Epigenetic Alterations in Lung Cancers

- Protooncogenes, Growth Factor Signaling, and Growth Factor–Targeted Therapies
- The Technology of Genomic Analyses of Lung Cancer
- Epigenetics/Epigenome
- Tumor Suppressor Genes and Growth Suppression
- Cyclins and Cell Cycle Regulatory Pathways
- LKB1, AMPK, and mTOR Pathway
- Other Putative Tumor Suppressors
- Other Biologic Abnormalities in Lung Cancer
- MicrornAS in Lung Cancer Diagnostics and Therapy
- MiRNA Profiling in Lung Cancer
- Invasion, Metastasis, and Angiogenesis
- Cancer Stem Cell Hypothesis 12
- Molecular Tools in the Lung Cancer Clinic

41. NON-SMALL CELL LUNG CANCER

- Incidence and Etiology
- Anatomy and Pathology
- Prevention and Screening
- Diagnosis
- Stage Evaluation
- Management by Stage
- Special Clinical Situations
- Palliative Care

42. SMALL CELL AND NEUROENDOCRINE TUMORS OF THE LUNG

- Small Cell Lung Cancer
- Typical and Atypical Carcinoid Tumors
- Large Cell Neuroendocrine Carcinoma

43. NEOPLASMS OF THE MEDIASTINUM

- Thymic Neoplasms
- Thymoma
- Thymic Carcinoma
- Thymic Carcinoid
- Thymolipoma
- Germ Cell Tumors

SECTION 3. CANCERS OF THE GASTROINTESTINAL TRACT

44. MOLECULAR BIOLOGY OF THE ESOPHAGUS AND STOMACH

Molecular Biology of Esophageal Cancer

45. CANCER OF THE ESOPHAGUS

- Epidemiology
- Etiologic Factors and Predisposing Conditions
- Applied Anatomy and Histology
- Natural History and Patterns of Failure
- Clinical Presentation
- Diagnostic Studies and Pretreatment Staging
- Pathologic Staging
- Treatment
- Stage-directed Treatment Recommendations

46. CANCER OF THE STOMACH

- Anatomic Considerations
- Pathology and Tumor Biology
- Histopathology
- Patterns of Spread
- Clinical Presentation and Pretreatment Evaluation
- Pretreatment Staging
- Staging, Classification, and Prognosis
- Gastric Cancer Nomograms: Predicting Individual Patient Prognosis after Potentially Curative Resection
- Treatment of Localized Disease
- Technical Treatment-Related Issues
- Treatment of Advanced Disease (Stage IV)
- Surgery in Treatment of Metastatic Gastric Cancer
- Radiation for Palliation

47. GENETIC TESTING IN STOMACH CANCER

- Histologic Definitions and Descriptions
- Etiology
- Epidemiology of Gastric Cancer
- Screening and Management of Cancer Risk in HDGC
- Other Hereditary Cancer Susceptibility Syndromes with Increased Gastric Cancer Risk

48. MOLECULAR BIOLOGY OF PANCREAS CANCER

- Common Molecular Changes

49. CANCER OF THE PANCREAS

- Staging
- Epidemiology
- Pathology and Biology
- Exocrine Pancreatic Cancers
- Endocrine Pancreatic Cancers
- Pathology and Biology
- Exocrine Pancreatic Cancers
- Endocrine Pancreatic Cancers
- Stage I and II: Localized Pancreatic Ductal Adenocarcinoma
- Patterns of Failure
- Stage III: Locally Advanced Disease
- Emerging Role of Stereotactic Body Radiotherapy
- Stage IV: Metastatic Disease
- Future Directions and Challenges

50. GENETIC TESTING IN PANCREATIC CANCER

- Selected Genes that May Cause Pancreatic Cancer
- Selected Syndromes that Increase the Risk of Pancreatic Cancer
- Empiric Risk Counseling and Management

51. MOLECULAR BIOLOGY OF LIVER CANCER

- Genetic Alterations in Liver Cancer
- Epigenetic Alterations in Liver Cancer
- Mutational Landscape of Genetic Alterations in HCC: The Next Generation
- The Microenvironment of Liver Cancer
- Classification and Prognostic Prediction of Hepatocellular Carcinoma

52. CANCER OF THE LIVER

- Epidemiology
- Etiologic Factors
- Staging
- Diagnosis
- Treatment of Hepatocellular Carcinoma
- Adjuvant and Neoadjuvant Therapy
- Treatment of Other Primary Liver Tumors

53. CANCER OF THE BILIARY TREE

- Anatomy of the Biliary Tract
- Cholangiocarcinoma

- Gallbladder Cancer

54. CANCER OF THE SMALL BOWEL

- Small Bowel Cancer
- Adenocarcinoma
- Carcinoid Tumors
- Small Bowel Lymphoma
- Gastrointestinal Stromal Tumors
- Other Mesenchymal Tumors
- Metastatic Cancer to the Small Bowel

55. GASTROINTESTINAL STROMAL TUMOR

- Incidence and Etiology
- Anatomy and Pathology
- Screening
- Diagnosis
- Staging
- Management by Stage
- Palliative Care

56. MOLECULAR BIOLOGY OF COLORECTAL CANCER

- Multistep Models of Colorectal Tumorigenesis
- Inherited Syndromes of Increased Cancer Risk Highlight Early Events and Critical Pathways in Colorectal Tumorigenesis
- Oncogene and Tumor Suppressor Gene Mutations in Colorectal Cancer Progression
- The Mutational Landscape of Colorectal Cancer
- An Integrated Model for Colorectal Cancer Initiation and Progression
- Summary

57. CANCER OF THE COLON

- Epidemiology
- Etiology: Genetic and Environmental Risk Factors
- Familial Colorectal Cancer
- Anatomy of the Colon
- Diagnosis of Colorectal Cancer
- Screening for Colorectal Cancer
- Staging and Prognosis of Colorectal Cancer
- Approaches to Surgical Resection of Colon Cancer
- Surgical Management of Complications from Primary Colon Cancer
- Polyps and Stage I Colon Cancer
- Stage II and Stage III Colon Cancer

- Treatment of Stage II Patients
- Treatment Options for Stage III Patients
- Follow-Up after Management of Colon Cancer with Curative Intent
- Surgical Management of Stage IV Disease
- Management of Unresectable Metastatic Disease
- Molecular Predictive Markers

58. GENETIC TESTING IN COLON CANCER (POLYPOSIS SYNDROMES)

Adenomatous Polyposis
Hamartomatous Polyposis

59. GENETIC TESTING IN COLON CANCER (NONPOLYPOSIS SYNDROMES)

Clinical Classification: Amsterdam Criteria and Bethesda Guidelines
Tumor Screening
Genetic Testing
Genetic Counseling for Lynch Syndrome
Management of Lynch Syndrome

60. CANCER OF THE RECTUM

Anatomy
Staging
Surgery
Does Adjuvant Radiation Therapy Impact Survival?
Preoperative Radiation Therapy
Which Patients Should Receive Adjuvant Therapy?
Concurrent Chemotherapy
Synchronous Rectal Primary and Metastases
Management of Unresectable Primary and Locally Advanced Disease (T4)
Radiation Therapy Technique

61. CANCER OF THE ANAL REGION

- Epidemiology and Etiology
- Screening and Prevention
- Pathology
- Clinical Presentation and Staging
- Prognostic Factors
- Treatment of Localized Squamous Cell Carcinoma

- Treatment of Other Sites and Pathologies

SECTION 4. CANCERS OF THE GENITOURINARY SYSTEM

62. MOLECULAR BIOLOGY OF KIDNEY CANCER

Von Hippel-Lindau Disease

Hereditary Papillary Renal Carcinoma Type 1

Xp11.2 Translocation Renal Cell Cancer

Birt-Hogg-Dubé Syndrome

Hereditary Leiomyomatosis and Renal Cell Carcinoma

Familial Renal Cancer: Succinate Dehydrogenase Gene

Tuberous Sclerosis Complex

63. CANCER OF THE KIDNEY

- Epidemiology, Demographics, and Risk Factors
- Pathology of Renal Cell Carcinoma
- Differential Diagnosis and Staging
- Hereditary Kidney Cancer Syndromes, Genetics, and Molecular Biology
- Treatment of Localized Renal Cell Carcinoma
- Treatment of Locally Advanced Renal Cell Carcinoma
- Adjuvant Therapy for Renal Cell Carcinoma
- Surgical Management of Advanced Renal Cell Carcinoma
- Systemic Therapy for Advanced Renal Cell Carcinoma
- Conclusion and Future Directions

64. MOLECULAR BIOLOGY OF BLADDER CANCER

- Key Molecular Alterations in Stage Ta Urothelial Carcinoma
- Key Molecular Alterations in Invasive Urothelial Carcinoma
- Information from Exome Sequencing
- Epigenetic Alterations
- Information from Expression Profiling
- Urothelial Tumor–Initiating Cells
- Molecular Pathogenesis and Tumor Clonality
- Multiple Tumor Subgroups Defined by Molecular Profiling

65. CANCER OF THE BLADDER, URETER, AND RENAL PELVIS

- Urothelial Cancers
- Cancer of the Bladder
- Cancers of the Renal Pelvis and Ureter

66. GENETIC TESTING IN URINARY TRACT CANCERS

- Genetic Susceptibility to Renal Cell Carcinoma
- Genetic Susceptibility to Urothelial Cancers
- Indications for Genetic Testing
- Genetic Testing and Counseling

67. MOLECULAR BIOLOGY OF PROSTATE CANCER

- Overview of the Genomic Landscape of Prostate Cancer
- Androgen Receptor Biology and Therapy
- Additional Pathways Frequently Altered During Disease Progression
- ETS Gene Fusions and the Molecular Subtypes of Prostate Cancer
- Emerging Areas in Prostate Cancer Biology and Therapy

68. CANCER OF THE PROSTATE

- Incidence and Etiology
- Anatomy and Pathology
- Screening
- Diagnosis, Risk Assessment, and State Assignment
- Principles of Treatment and Assessing Outcomes
- Management by Clinical States
- External Beam Radiotherapy
- Androgen Deprivation Therapy and Radiotherapy
- Adjuvant Radiation Therapy for High-Risk Patients after Radical Prostatectomy
- The Rising Prostate-Specific Antigen State
- Advanced Prostate Cancer: Rising Prostate-Specific Antigen and Clinical Metastases—Noncastrate and Castrate
- Palliation
- Future Directions

69. CANCER OF THE URETHRA AND PENIS

- Cancer of the Male Urethra
- Carcinoma of the Female Urethra
- Cancer of the Penis

70. CANCER OF THE TESTIS

- Incidence and Epidemiology
- Initial Presentation and Management
- Histology
- Biology
- Immunohistochemical Markers
- Staging
- Management of Clinical Stage I Disease

- Management of Clinical Stage II (Low Tumor Burden)
- Management of Stage II with High Tumor Burden and Stage III Disease
- Management of Recurrent Disease
- Treatment Sequelae
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- Pathophysiology of Treatment-Induced Nausea and Vomiting
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PART VI

PALLIATIVE AND ALTERNATIVE CARE

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1. Respect human life and the dignity of every individual.
2. Refrain from supporting or committing crimes against humanity and condemn all such acts.
3. Treat the sick and injured with competence and compassion and without prejudice and apply the knowledge and skills when needed.
4. Protect the privacy and confidentiality of those for whom we care and breach that

confidence only when keeping it would seriously threaten their health and safety or that of others.

5. Work freely with colleagues to discover, develop, and promote advances in medicine

and public health that ameliorate suffering and contribute to human well being.

6. Educate the public about present and future threats to the health of humanity.

7. Advocate for social, economic, educational and political changes that ameliorate suffering and contribute to human well being.

8. Teach and mentor those who follow us, for they are the future of our caring profession.

3. CLINICAL TRAINING:

Clinical training during the 3 year period will involve Postings surgical oncology and in allied specialities like medical and radiation oncology, onco-pathology, molecular oncology, epidemiology & biostatistics, endoscopy, pain & palliative care. During the clinical postings, the student is expected to work under the guidance of the faculty in the wards, out-patient departments and the operation theatres. The student is expected to be involved in all aspects of patient care in the wards, do the ward rounds independently and with the faculty, examine patients in the out-patient department and order investigations as required and discuss with the faculty about the final treatment plan, observe, assist and perform surgeries under supervision, be involved in the postoperative management of the patients including intensive care. The student is also expected to take part in all academic programmes including but not limited to lectures, case presentations, debates, multi-disciplinary tumor board etc. Exposure to Minimally invasive surgical procedures, Prevention, screening, early detection, Palliative care, rehabilitation, etc.

Medical Oncology – (1 month)

Radiation Oncology – (1 month)

Onco-pathology, Molecular oncology, Epidemiology & Biostatistics,

Endoscopy, Pain & Palliative care - (2 months)

During II year, students are encouraged to undergo special postings for learning new advanced techniques / Procedure / Skills in institutions of higher repute where the requisite facilities are available without affecting the duties of the parent department.

4 .SKILL TRAINING:

During the period of 3 years, the student is expected to assist/perform under supervision, the following procedures in various disciplines:

Breast & Gynaecology:

Extrascapular hysterectomy

Wertheim's hysterectomy

Modified radical mastectomy

Breast conservation surgery

Pelvic lymphadenectomy

Sentinel node biopsy

Cytoreductive surgery for

ovarian/endometrial cancer
Simple or modified radical vulvectomy
Pelvic exenterations.

Head & Neck:

Laryngectomy
Oral resections
Laryngopharyngo esophagectomy
Parotidectomy, thyroidectomy
Neck dissection- radical/ modified
radical/ selective
Composite resection
Myocutaneous flaps
Local flaps in head and neck

Thoracic oncology

Lobectomy and pneumonectomy
3 field lymphadenectomy Ca esophagus
Transhiatal esophagectomy
Lung metastatectomy

Urology:

Ilio inguinal block dissection
Radical cystectomy with conduit/
neobladder
Radical prostatectomy
Retroperitoneal lymph node dissection
Radical nephrectomy
Total penectomy, Partial penectomy, Emasculations.
Sentinel node biopsy for penile cancer

Musculoskeletal and Cutaneous Oncology

Limb salvage surgery for extremity sarcomas
Hemipelvectomy.
Shoulder resection
Internal hemipelvectomy – different types
Sacrorectomy- All types.
Amputation- all types
Soft tissue sarcoma- wide excision, Muscle group excisions, Compartmental
resections.
Cutaneous tumour- wide excision and node dissections.
Wide excision of soft tissue sarcoma of different types including vascular
resections and grafting.
Wide excision of cutaneous tumour with
SLN biopsy for melanoma.

Gastrointestinal

Abdominoperineal resection (standard and extralevator)
(Low) anterior resection
Inter sphincteric resection rectum
Radical Gastrectomy with D2 lymph adenectomy
Hepatic resections- major/metastatectomy
Whipple's pancreaticoduodenectomy
Hemicolectomies.
Any other surgeries as per availability during the period of training.

Besides the above, the student will also be taught to independently perform the following procedures:

Biopsies- Node, Trucut, Wedge, Incisional
Dilation and curettage
Colposcopy
Central line/ chemoport insertion
Tracheostomy, colostomy, ileostomy.

5 .TEACHING METHODOLOGY:

1. Classroom lectures- twice a week
2. Clinical case presentation- once a week
3. OP clinics- twice a week
4. Performance of surgery
5. Per-operative teaching sessions- 4 days a week
6. Debate- once in 3 months
7. Clinico Pathological Conference- once a week
8. Seminar- once in 3 months
9. Grand Rounds- once in 3 months
10. CME- once in 3 months
11. Tumour Boards- twice a week
12. Journal club – once in a month
13. Trials discussion- once in a month

6 . RESEARCH WORK:

During the period of the course, the student is taught the fundamentals of clinical and basic sciences research. This includes:

1. Basic knowledge of clinical research methods, biostatistics, epidemiology and ethics.
2. Basic knowledge of cell biology, molecular biology, molecular genetics and immunology
3. Critical analysis of current literature, ability to formulate research questions, make a study design, calculate sample size, data management, ways to avoid bias etc.
4. Preparation of proposals for funding and evaluation by institutional review boards

5. Presentation of work in written/oral form at Conferences
6. Help mentors in peer review of articles submitted for publication.

Students should compulsorily attend Research Methodology workshop conducted by the University within first six months of M.Ch Course.

7. LOG BOOK:

The Postgraduate student of a Postgraduate Degree Course in Super specialties shall maintain Log Book of the work carried out by them and the training programme undergone during the period of training including details of surgical operations assisted or done independently.

The Log Book shall be checked and assessed by the faculty members imparting the training.

Periodical evaluation of Log Book to be done by the Head of the Department as per 52nd SAB.

The Evaluation of the candidates in both theory and practical aspects will help the candidate in the improvement of his/her knowledge skills & attitude.

8. COMPETENCY ASSESSMENT:

Overall:

1. Communication / Commitment / Contribution /		
Compassion towards patients and Innovation	-	10 Marks
2. Implementation of Newly learnt techniques	-	10 Marks
3. Documentation of case sheets / discharge		
Summary / Review	-	10 Marks
4. Number of cases presented in Clinical Meetings/Journal		
Clubs / Seminars / Papers presented in Conference.	-	10 Marks
5. No. Of Medals/ Certificates won in the conference / Quiz		
competitions and other academic meetings with details.	-	10 Marks

Total		50 Marks

Assessment	I	- February	-	First Year
	II	- August	-	First Year
	III	- February	-	Second Year
	IV	- August	-	Second Year
	V	- February	-	Third Year
	VI	- May	-	Third Year

VIVA INCLUDING COMPETENCY ASSESSMENT – 100 Marks (50+50)

9 .THEORY EXAMINATION:

Paper I	- Basic Sciences as applied to Surgical Oncology
Paper II	- Surgical Oncology I
Paper III	- Surgical Oncology II
Paper IV	- Recent Advances in Surgical Oncology

Each paper will contain:

- | | |
|------------------------|---------------------|
| 1. Essay questions (2) | - 2 X 15 = 30 Marks |
| 2. Short Notes (10) | - 10 X 7 = 70 Marks |

Total	----- 100 Marks -----
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10 .PRACTICAL EXAMINATION SCHEME:

Particulars	Time for candidate to examine the cases	Time for examiners to question the candidates	Maximum Marks
Long Case	1 Case x 60 Minutes	60 Minutes	100
Short Case	2 Cases x 15 Minutes	30 Minutes	100
Ward Rounds	3 Patients x 10 Minutes	30 Minutes	100
OSCE	5 Stations x 3 Minutes	15 Minutes	50
Viva Voce		15 Minutes	100
Log Book			50
Total			500

“13.9 A Postgraduate student of a Postgraduate degree Course in broad specialties/Super Specialties would be required to present one poster presentation to read one paper at a National/State conference and to present one Research paper which should be published/accepted for publication/sent for publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate Degree Examination”.

Apart from Poster/Oral paper presentation in National/State conferences, the Research paper published by the candidate in the University Journal of Medical Sciences will be considered as equivalent to the Research Paper as mentioned in 13.9. clause. Case Reports can also be published in University Journal of Medical Sciences but case reports will not be considered as Research Paper.

The candidate can also present Research Paper as per Clause 13.9 of Post Graduate Education Regulation 2000, and if the article sent for publication by the candidate as primary author or corresponding author which has not yet been published/accepted for publication, the candidate should submit a letter from the HOD, stating that the article sent for publication is of publishable merit and the proof of the Research Article submitted to the Journal for publication should be sent to the university forwarded through the HOD [as per 53rd SAB]

The student can submit articles for the University journal anytime from the time of registration till 6 months prior to theory examination.

11. OSCE (5 stations):

1. Clinical Scenario with clinical details - (2 stations)
2. Operative Surgery- Video/Photograph (1 station)
3. Clinical Photograph (1 station)
4. Photographs of Endoscopic findings/ Equipment or any other finding (1 station)

12 .RECOMMENDED REFERENCE BOOKS:

GENERAL

DEVITA (Vincent Devita, Hellman and Rosenberg's Cancer: Principles and practice of Oncology Ed.10

BREAST BLAND (Kirby) and COPELAND III (Edward M)
Breast: Comprehensive management of benign and malignant diseases Ed.4

GYNECOLOGY

BEREK (Jonathan S) and HACKER (Neville)
Berek and Hacker's Gynecologic ,Oncology Ed.6
BARKAT (Richard R)
Principles and practice of gynaecologic oncology Ed.5

HEAD AND NECK

WATKINSON (John C) and GILBERT (Ralph W)
Stell and Maran's textbook of Head and Neck surgery and oncology Ed. 5
SHAH (Jatin) Jatin Shah's head and Neck surgery and Oncology Ed.4
MYERS (Eugene)
Skull Base surgery: Master techniques in
otolaryngology – Head and neck surgery

UROLOGY WEIN (Alan J) Ed Campbell- Walsh Urology Ed. 10

BONE AND SOFT TISSUE

MALAWER (Martin M) et al
Operative techniques orthopaedic, Oncology,CANALE (terry s) and BEATY (James)
Campbell's operative Orthopedics Ed.12

HEPATOBILLARY BLUMGART (Leslie H) Ed

Surgery of the Liver, Biliary Tract., and Pancreas Ed. 4

GASTROINTESTINAL

YEO (Charles J) Shackelford's surgery of the alimentary tract. Ed. 7

****Note:** The editions are as applicable and the latest editions shall be the part of the syllabi.

13 .RECOMMENDED JOURNALS FOR READING:

1. Indian Journal of Surgical Oncology
2. Indian Journal of Cancer
3. Journal of Surgical Oncology
4. Annals of Surgical Oncology
5. European Journal of Surgical Oncology
6. Surgical Oncology Clinics of North America
7. Surgical Clinics of North America
8. Journal of Clinical Oncology
9. Seminars in Oncology
10. British Journal of Surgery
11. Lancet oncology
12. Lancet
13. New England Journal of Medicine

M.Ch - VASCULAR SURGERY

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI

Syllabus - M.Ch -Vascular Surgery Curriculum

I. AIMS:

The provision of excellent care for the vascular surgical patient, delivered safely, is at the heart of the curriculum. The aims of the curriculum are to ensure the highest standards of vascular surgical practice in INDIA by delivering high quality surgical training and to provide a program of training from the completion of the foundation years through to the completion of specialist surgical training, culminating in the award of a M.Ch. Degree.

The curriculum is based on the following key principles that support the achievement of these aims:

- ❖ A common format and similar framework.
- ❖ Systematic progression from the end of the foundation years through to the exit from surgical specialist training.
- ❖ Curriculum standards that are underpinned by robust assessment processes, both of which conform to the standards specified by the MCI.
- ❖ Regulation of progression through training by the achievement of outcomes that are specified within the specialty curricula. These outcomes are competence based rather than time-based.
- ❖ Delivery of the curriculum by vascular surgeons who are appropriately qualified to deliver surgical training.
- ❖ Formulation and delivery of surgical care by surgeons working in a multidisciplinary environment.
- ❖ Collaboration with those charged with delivering health services and training at all levels.

II. OBJECTIVES:

The vascular surgical curriculum has been designed around four broad areas, which are common to all the surgical specialties:

1. **Syllabus:** What trainees are expected to know, and be able to do, in the various stages of their training?

2. **Teaching and learning:** How the content is communicated and developed and how trainees are supervised.
3. **Assessment:** How the attainment of outcomes is measured / judged and feedback to support learning.
4. **Training systems and resources** - how the educational program is organized, recorded and quality assured.

In order to promote high quality, safe care of surgical patients, the curriculum specifies the parameters of knowledge, clinical skills, technical skills, professional behavior and leadership skills that are considered necessary to ensure patient safety throughout the training process and specifically at the end of training. The curriculum therefore provides the framework for vascular surgeons to develop their skills and judgment and a commitment to lifelong learning in line with the service they provide.

III. THEORY SYLLABUS:

The Specialty of Vascular Surgery is an upcoming surgical specialty in INDIA and has evolved out as the specialty of general surgery. The Vascular Surgery Syllabus and the ability at the completion of training to manage a vascular emergency 'take', provide a common purpose across the specialty of Vascular Surgery.

The major areas of special interest associated with the specialty of Vascular Surgery are listed below, each involving the acquisition of both open and endovascular / endovenous competencies to include relevant imaging skills:

- © Aortic
- © Carotid
- © Limb salvage
- © Vascular Access
- © Reno – vascular
- © Visceral

In addition to these clearly defined disease-based areas of special interest there are others that are less well developed within the syllabus but represent substantial areas of practice:

- © Vascular Surgery related to trauma

© The Vascular Surgery of Childhood

© Vascular medicine

The variations in the scope of practices within the specialty are highly variable and largely shaped by local circumstances, the needs of the service and the personal development of the surgeons delivering those services. All vascular surgeons will be given the opportunity to develop an area of special expertise by the time they gain their M.Ch Degree and some will then go on to include that area as a major part of their consultant practice as their individual careers develop. There is also significant shared ('Interface') practice with other specialties and subspecialties such as interventional radiology, cardiology, cardiothoracic surgery, Diabetology, Geriatric medicine, Nephrology, transplant surgery and Neurology.

Areas of Special Interest:

- © Superficial and Deep venous disease
- © Lower limb ischaemia (acute and chronic)
- © Upper limb ischemia (acute and chronic)
- © Aortic aneurysmal disease
- © Peripheral artery aneurysms
- © Vascular accesses
- © Reno vascular disease
- © Carotid artery disease
- © Mesenteric vascular disease
- © Vascular trauma
- © Hyperhidrosis
- © Lymphoedema
- © Endovascular Interventions
- © Thoracic outlet syndrome
- © Diabetic foot
- © Vascular anomalies
- © Vasospastic disorders and vasculitis

Index Procedures:

In Vascular Surgery these are generally groups of procedures which are common and/or are seen as representing important areas of technical expertise. The more common procedures are also used during assessment by Surgical Directly Observed Procedural Skills (Surgical DOPS) and Procedure Based Assessments (PBAs).

- © Aortic aneurysm
 - o Elective open repair tube graft
 - o Elective open repair bifurcated graft
 - o Endovascular repair
 - o Ruptured aneurysm repair
- © Aorto - iliac occlusion
 - o Aorto - bifemoral/biiliac bypasses
 - o Extra anatomic bypasses
- © Carotid Endarterectomy
- © Infra-inguinal bypasses
- © Tibial artery bypasses
- © Emergency Embolectomies
- © Fasciotomies for compartment syndrome
- © Repair of false aneurysms
- © Re-do Vascular Surgery
- © Removal of infected graft
- © Varicose vein surgery
 - o Surgeries
 - o Endovenous ablations
 - o Foam sclerotherapy
- © Vascular access
- © AV fistula at wrist, upper arm

- © Revision of failed AV fistula
- © Endovenous stenting/plasty
- © IVC filters

Bioethics:

1. Respect human life and the dignity of every individual.
2. Refrain from supporting or committing crimes against humanity and condemn all such acts.
3. Treat the sick and injured with competence and compassion and without prejudice and apply the knowledge and skills when needed.
4. Protect the privacy and confidentiality of those for whom we care and breach that confidence only when keeping it would seriously threaten their health and safety or that of others.
5. Work freely with colleagues to discover, develop and promote advances in medicine and public health that ameliorate suffering and contribute to human well being.
6. Educate the public about present and future threats to the health of humanity.
7. Advocate for social, economic, educational and political changes that ameliorate suffering and contribute to human well being.
8. Teach and mentor those who follow us, for they are the future of our caring profession.

IV. CLINICAL TRAINING:

The training programme shall aim to provide sound knowledge in the diagnostic and investigative aspects of Vascular Surgery for the candidate.

It will provide practical training in clinical and operative surgery including endovascular surgery. In addition to the exposure to Vascular Surgery at the institute, the candidate will also have an opportunity during the training period to spend a period up to three months in other specialized centers for enriching his experience in Vascular Surgery.

During the training period the candidate shall work for all three years on full-time resident basis under the Head of the Department Vascular Surgery. He shall take part in all activities of the department including participation in seminars, conferences, teaching

assignment, operating sessions, experimental surgery and other duties that may be assigned to him by the Head of the Department.

❖ **Four Months Rotation among Units**

❖ **Special Postings:**

➤ **First Year:**

- o Radiology 15 Days
- o Cardiothoracic Surgery 15 Days

➤ **Second Year:**

- o Students are encouraged to undergo special postings for learning new advanced techniques / Procedure / Skills in institutions of higher repute where the requisite facilities are available without affecting the duties of the parent department (Maximum of two months)

CONFERENCES:

Students are encouraged to participate in

- ✓ Annual Conferences / Mid Term Conferences
- ✓ International Conferences
- ✓ Paper Presentation

In general terms, by the end of training, vascular surgeons have to demonstrate:

- ✓ Theoretical and practical knowledge related to surgery in general and to their specialty practice
 - ✓ Technical and operative skills
 - ✓ Clinical skills and judgments
 - ✓ Generic professional and leadership skills;
- © An understanding of the values that underpin the profession of vascular surgery and the responsibilities that comes with being a member of the profession. The special attributes needed to be a vascular surgeon.
- © A commitment to their ongoing personal and professional development and practice using reflective practice and other educational processes.

- © An understanding and respect for the multi-professional nature of healthcare and their role in it and
- © An understanding of the responsibilities of being an employee of a hospital and/or a private practitioner.

V. SKILL TRAINING:

FIRST YEAR TOPICS:

1. VASCULAR ANATOMY

Objective

- o Knowledge of anatomy and embryology of the vascular system

Knowledge

- o Anatomy of venous, arterial and lymphatic system
- o Normal and abnormal embryological development of the circulation Anatomy

Clinical Skills

- o Able to relate anatomy to imaging and to operative findings
- o Palpation of peripheral pulses
- o Palpation of the abdominal aorta
- o Able to explain vascular anatomy to patients and colleagues

2. VASCULAR PHYSIOLOGY

Objective

- o Knowledge of the physiology of the circulation

Knowledge

- o Detailed knowledge of the control of blood pressure and factors affecting it
- o Detailed knowledge of blood flow, haemostasis and the effects of haemorrhage
- o Detailed knowledge of the effects of ischaemia and reperfusion
- o Detailed knowledge of microcirculatory and lymphatic physiology

Clinical Skills

- o Able to safely manage a patient in the early post-operative phase after major vascular interventions e.g. cardiac, respiratory and renal monitoring and support
- o Able to correct clotting abnormalities in patients undergoing vascular interventions
- o Able to undertake prophylactic and therapeutic anticoagulation

- o Can explain vascular physiology to patients and colleagues

3. VASCULAR PATHOLOGY

Objective

- o Knowledge of the diseases (congenital and acquired) of the circulation

Knowledge

- o Aware of the congenital and pathological conditions that affect the circulation
- o A detailed knowledge of atherosclerosis and its associated risk factors, venous disease, lymphatic disease, thromboembolic disease, vasospastic and vasculitic disease
- o A detailed understanding of the mechanisms of vascular trauma, causes of peripheral neuropathy, alternative causes for limb pain (neurological and musculoskeletal)

Clinical Skills

- o Able to take detailed history from patient with arterial or venous disease
- o Examination of ischaemia and aneurysmal disease
- o Examination of varicose veins and swollen leg
- o To detect pathological arterial and venous abnormalities
- o Able to prioritize to recognize patients who need to be seen or treated urgently
- o To select appropriate investigations tailored to the individual patient
- o To explain vascular disease to patients and colleagues

Technical Skills

- o Hand - held Doppler assessment of varicose veins
- o Ankle Brachial Pressure Indices and waveform interpretation
- o Duplex ultrasound assessment of varicose veins

4. VASCULAR EPIDEMIOLOGY

Objective

- o Knowledge of the epidemiology of vascular disease

Knowledge

- o Principles of epidemiology, including basic study design and relevant terms.
- o Epidemiology of peripheral arterial disease.
- o Epidemiology of venous disorders including varicose veins and venous thromboembolism.
- o Epidemiology and interactions of major vascular risk factors including smoking demographics

Clinical Skills

- o Explanation of risk factors to a patient with vascular disease

5. SCREENING AND SURVEILLANCE

Objective

- o Knowledge of the principles of screening

Knowledge

- o Key elements of design and delivery of screening tests in general AAA screening and surveillance programme.
- o Governance and quality control of AAA screening.
- o EVAR/TEVAR and vein graft surveillance

Clinical Skills

- o Counseling a patient undergoing screening or who has a positive screening test

Technical Skills

- o Measure AAA diameter in US scan

6. RISK FACTOR MODIFICATION

Objective

- o Knowledge of vascular risk factors and risk factor modification

Knowledge

- o Blood pressure control.
- o Lipid lowering therapy.
- o Management of diabetes.
- o Smoking cessation.
- o Antiplatelet and anticoagulant therapy.
- o Exercise and exercise therapy.
- o Dietary factors and weight control.
- o Guidelines for hypertension and hyperlipidaemia management

Clinical Skills

- o Explanation of risk factor modification to a patient
- o Ability to assess and prescribe blood pressure and other risk factor medication.
- o Understanding of main drug interactions and side effects of key risk reduction drugs (e.g. statins, antiplatelet agents & antihypertensives).
- o Smoking cessation counseling

- o Dietary and exercise advice to PAD patients
- o Interpretation of a lipid screen and other relevant biochemical screens

Technical Skills

- o Set up an insulin sliding scale

7. VASCULAR CONDITIONS OF CHILDHOOD

Objective

- o Assessment and management of children with developmental and traumatic conditions of their circulatory system

Knowledge

- o Principles of surgery in children
- o Vascular conditions of childhood including trauma.
- o Haemangiomas, venous malformations, AV malformations and lymphatic malformations.
- o Treatment options

Clinical Skills

- o History and examination of children.
- o Communication with parents and /or carers
- o Examination of vascular anomalies
- o Investigation of vascular anomalies (Hand-held Doppler, Duplex ultrasound and Arteriography)
- o Management strategy (Medical including compression, Endovascular & Surgical)

Technical Skills

- o Arterial repair (e.g. following supracondylar fracture)
- o Vascular access

8. NUTRITION

Objective

- o Recognise the need for artificial nutritional support, assess whether this is appropriate and arrange treatment

Knowledge

- o Effects of malnutrition, both excess and depletion
- o Methods of screening and assessment

Clinical Skills

- o Arrange access to suitable artificial nutritional support.

- o Dietary supplements.
- o Enteral nutrition and Parenteral nutrition

Technical Skills

- o Insertion of untunneled central venous catheter
- o Insertion of tunneled central venous catheter (Hickman or port)

9. CARDIO-RESPIRATORY DISEASE

Objectives

- o Assessment and management of patients with co-existent cardiac and/or respiratory disease

Knowledge

- o Anatomy of the heart and lungs
- o Cardio-respiratory physiology
- o Cardio-respiratory pathology (IHD, MI, heart failure, COPD, ARDS)
- o Prognosis and impact upon patients undergoing major vascular surgery
- o Therapeutic options including pharmacology and drug interactions.
- o Current guidelines on resuscitation
- o Define indications for and hemodynamic consequences of positive pressure ventilation

Clinical Skills

- o Examination of the heart and lungs
- o Select patients who require pre-operative investigations (ECG, ECHO, MUGA, 24hr tape, CXR, CT, respiratory function, CPX testing)
- o Interpretation of results
- o Identify patients unsuitable for vascular intervention

Technical Skills

- o Arterial blood gas sampling and interpretation of the results.
- o Basic management of acute MI/heart failure, Cardiopulmonary resuscitation (ALS)
- o Insertion of chest drain and management.
- o Mini tracheostomy

10. HAEMATOLOGY

Objectives

- o Competent in relevant aspects of blood transfusion, bleeding disorders and drugs that affect clotting

Knowledge

- o Coagulation and fibrinolysis pathways
- o Epidemiology, natural history, and molecular basis of haemophilia and Thrombophilia
- o Pharmacology of unfractionated heparin, LMWH, Warfarin and antiplatelet agents.
- o Principles of donor selection and preparation of blood components and viral safety.
- o Coagulation factors and their side effects
- o Principles of clinical blood transfusion including hazards of blood transfusion.
- o Methods of blood conservation including pre-donation and intra-operative cell salvage.
- o Mechanism of DIC.
- o Effect of massive blood transfusion, renal and hepatic disease

Clinical Skills

- o Interpretation of laboratory results
- o Methods and complications of reversing anti-coagulation in patients with and without haemorrhage.
- o Management of haemophilia and thrombophilia in terms of treatment and prophylaxis before vascular surgery.
- o Initiation and monitoring of anticoagulation.
- o Initiation of antiplatelet therapy in various situations.
- o Appropriate use of blood and blood products,
- o Management of complications from blood transfusion

Technical Skills

- o Intra-operative use of heparin, monitoring techniques (TEG) and reversal using protamine

11. CLINICAL AUDIT, RESEARCH & HEALTH ECONOMICS

Objective

- o An understanding of the relevance of clinical audit, research and health economics to the practice of vascular surgery

Knowledge

- o National Vascular Database
- o Principles of audit and quality control
- o Principles of clinical research and systematic review

- o Evidence based vascular practice
- o Knowledge of key health economic terms
- o Important generic QOL tools for venous and arterial disease
- o Relevance of QALYS and calculation of incremental cost effectiveness ratio
- o Types of health economic analyses
- o Planning and budgeting vascular services

Clinical Skills

- o Participation in local and national audit of outcomes
- o Conducting a morbidity and mortality meeting
- o Conducting a journal club
- o Participation in clinical research Presentations at vascular meetings
- o Publications in vascular journals
- o Can explain the principles of health economics to patients, colleagues and managers

12. OUTPATIENT, WARD and MDT MEETINGS

Objective

- o Assess individual vascular outpatients and inpatients
- o Manage an outpatient clinic
- o Ward rounds and multi disciplinary meetings

Knowledge

- o Individual patient assessment
- o Relevant vascular anatomy, physiology and clinical knowledge
- o Outpatient and inpatient service
- o Understanding of hospital organisation
- o Understanding of multi-disciplinary team and meetings
- o Relevant guidelines for vascular disease management

Clinical Skills

- o Individual patient assessment
- o Focused history taking and examination
- o Organise appropriate investigations
- o Management of an outpatient clinic, ward round and MDT meeting
- o Presentation of patients on ward round and at MDT
- o Ability to allocate management of patients to appropriate team members,
- o Appropriate referral to other specialists when indicated

- o Liaison with critical care and other support services (e.g. pain team, physiotherapy, rehab)
- o Ability to prioritise urgent patient appointments, investigations and interventions
- o Prompt and clear clinic letters and discharge summaries

SECOND YEAR TOPICS:

1. PRINCIPLES OF VASCULAR IMAGING

Objective

- o Radiation safety
- o Principles and indications for vascular imaging

Knowledge

- o Principles of ultrasound, CT and MR imaging and catheter angiography
- o Dangers of ionizing radiation and safe practice
- o Monitoring of ionizing radiation and how exposure can be reduced
- o Regulations and requirements in use of ionizing radiation
- o Indications and factors determining appropriate investigation for a patient with vascular disease
- o Vascular contrast agents and associated hazards

Clinical Skills

- o Explanation of various imaging modalities to a patient
- o Selection of appropriate investigation
- o Evaluate patient for procedure
- o Identify factors that increase risk for patient

2. VASCULAR ULTRASOUND

Objective

- o To understand and be able to perform basic vascular ultrasound

Knowledge

- o Understand the principles of Doppler ultrasound
- o Understand limitations of US scanning
- o Understand ultrasound spatial resolution in relation to scan plane
- o Understand the requirements for imaging different vascular territories
- o Ultrasound image interpretation

Clinical Skills

- o Explanation of ultrasound to a patient

Technical Skills

- o Able to choose the appropriate ultrasound probe
- o Able to optimize grey scale imaging
- o Able to optimize colour flow imaging
- o Able to optimize pulsed wave settings
- o Able to perform superficial venous ultrasound studies
- o Able to perform arterial ultrasound studies for intra-operative quality control
- o Able to screen for AAA and measure the AP diameter
- o Percutaneous puncture of saphenous vein under US control
- o Percutaneous puncture of femoral artery under US control

3. COMPUTED TOMOGRAPHIC IMAGING

Objective

- o To understand, interpret and manipulate CT imaging and CT angiography

Knowledge

- o Understand how CT images are generated
- o Understand concepts of helical and multi-slice scanning
- o Understand that scans are performed in the axial plane
- o Understand CT spatial resolution
- o Recognise X-ray dose and risks associated with study
- o Recognise the need to tailor individual scan to clinical problem e.g. AAA elective vs. emergency, mesenteric/renal, carotid, peripheral and venous
- o Understand basic principles of image reformatting in various planes
- o Understand the principle behind image reconstruction and MIP images
- o Understand the use of intravascular and oral contrast agents
- o Recognise risks of intravascular contrast and how to avoid them
- o Understand common artifacts

Clinical Skills

- o Explanation of CT and the risks to a patient
- o Able to manage contrast reactions
- o Able to recognise normal cross-sectional anatomy
- o Able to recognise vascular pathology on scans

Technical Skills

- o Able to manipulate images on the console
- o Able to obtain appropriate measurements of blood vessels

4. MAGNETIC RESONANCE IMAGING

Objective

- o To understand, interpret and manipulate MR imaging and MR angiography

Knowledge

- o Understand how MR images generated
- o Recognise the risks of MRI
- o Understand that scans are performed in any plane
- o Understand MR spatial resolution in relation to scan plane
- o Recognise the need to tailor individual scan to clinical problem e.g. AAA elective vs. emergency, mesenteric/renal, carotid, peripheral and venous
- o Understand the principles of non contrast MR angiographic techniques
- o Understand the principles of contrast enhanced MR angiographic techniques
- o Understand basic principles of image reformatting in various planes
- o Understand the principle behind image reconstruction and MIP images
- o Understands the different types of MR angiographic contrast
- o Recognise common MR artifacts

Clinical Skills

- o Explanation of MRA and the risks to a patient
- o Able to recognise normal cross-sectional anatomy
- o Able to recognise vascular pathology on scans

Technical Skills

- o Able to manipulate images on the console
- o Able to obtain appropriate measurements of blood vessels

5. CATHETER ANGIOGRAPHY**Objective**

- o To understand and perform intra-operative catheter angiography

Knowledge

- o Commonly used arterial and venous access sites
- o Commonly used contrast agents, including Co2
- o Road mapping, parallax, measurement techniques, hand and power injection
- o Measures to improve angiographic imaging e.g. breath holding, multi-masking, centering, collimation, frame rate, antegrade etc
- o Risks of angiography
- o Guide wire and catheter types, characteristics and indications
- o Introducer, dilator and sheath types, characteristics and indications

Clinical Skills

- o Explanation of catheter angiography and the risks to a patient

Technical Skills

- o Retrograde femoral artery puncture
- o Antegrade femoral artery puncture
- o Ultrasound guided arterial and venous puncture
- o Obtains secure vascular access with sheath and flushes catheters
- o Pressure measurement
- o Positions guide wire and places non selective catheter using fluoroscopy
- o Keep radiation dose to minimum by use of appropriate by fluoroscopy, collimation and runs
- o Obtain satisfactory intra-operative angiograms
- o Recognize inadequate study and need for alternative angiographic views

THIRD YEAR TOPICS:

I. ENDOVASCULAR PROCEDURES

Objective

- o To gain endovascular knowledge and skills

Knowledge

- o Indications and outcomes for endovascular intervention
- o The complementary role of endovascular therapy to medical and surgical therapy
- o Balloon and stent types, characteristics and indications
- o Stent graft types, characteristics and indications
- o Materials used for embolisation, characteristics and indications
- o Closure devices, characteristics and indications

Clinical Skills

- o Explanation of endovascular intervention and the risks to a patient
- o Undertakes preoperative checks and team briefing
- o Demonstrates good patient, personal and team safety
- o Ensures good asepsis, especially when prosthetic materials are involved
- o Good communication with patient and all members of the angio team
- o Accurate procedural record and post-procedural instructions
- o Recognizes complications e.g. dissection, embolisation
- o Use drugs appropriately e.g. vasodilators, anticoagulants, analgesics, sedatives, anti- peristaltics

Technical Skills

- o Chooses appropriate equipment e.g. catheter , sheath, guide wire, balloon, stent
- o Perform selective catheterization
- o Manipulate catheter and wire across lesions
- o Performs balloon angioplasty in various vascular territories
- o Performs primary stenting in various vascular territories
- o Performs selective embolisation
- o Use of closure devices

II. OPEN VASCULAR SURGERY

Objective

- o To gain open vascular surgical knowledge and skills

Knowledge

- o Knows the importance of preoperative checks and team briefing for patient safety
- o Antibiotic prophylaxis and anticoagulation
- o Blood transfusion and the management of transfusion-related complications
- o Intra-operative cell salvage and the use of other blood products
- o Principles of local anaesthesia and local blocks e.g. metatarsal
- o Common vascular skin incisions and exposure
- o Methods of vascular control
- o Principles of vascular reconstruction
- o Intervention for varicose veins
- o Selection of amputation level
- o Types and characteristics of bypass grafts, anastomoses and vascular sutures
- o Types and characteristics of vascular instruments

Clinical Skills

- o Explanation of open vascular surgery and the risks to a patient
- o Demonstrates good patient, personal and team safety
- o Ensures good asepsis, especially when prosthetic materials are involved
- o Good communication with patient and all members of the theatre team
- o Accurate procedural record and post-procedural instructions

Technical Skills

- o Wound debridement
- o Local amputation (e.g. toes)
- o Major amputation (e.g. BKA)

- o Harvesting of long saphenous (or other) vein
- o Exposure and control of veins (e.g. SFJ)
- o Exposure and control of arteries (e.g. common femoral)
- o Arteriotomy and direct or patch repair
- o End-to-end and end-to-side anastomosis
- o Embolectomy + on-table arteriogram/thrombolysis

1. ACUTE LOWER LIMB ISCHAEMIA

Objective

- o Ability to recognise acute lower limb ischaemia and institute emergency management

Knowledge

- o Anatomy of arterial system
- o Lower limb neurology
- o Pathophysiology of acute limb ischaemia - Embolism, Thrombosis, Trauma (blunt & penetrating), Fractures & dislocations and Iatrogenic injury
- o Pathophysiology of compartment syndrome
- o Investigations - Doppler/Duplex, Angiography, Compartment pressures, Intra-operative angiogram, ECG & echocardiogram
- o Management - conservative, embolectomy, thrombolysis & primary amputation

Clinical Skills

- o History
- o Examination
- o Co-ordination with trauma team

Technical Skills

- o Hand-held Doppler assessment
- o Duplex ultrasound assessment
- o Measurement of compartment pressures
- o Surgical approaches to the arterial tree
- o Surgical control of lower limb blood vessels
- o Embolectomy (blind & directed, femoral/popliteal)
- o On table angiography and thrombolysis
- o Emergency arterial reconstruction
- o Vascular shunts
- o Lower leg fasciotomies
- o Emergency venous reconstruction

- o Percutaneous thrombolysis
- o Percutaneous clot aspiration

2. VASCULAR TRAUMA

Objective

- o Identification, assessment and management of injuries to blood vessels and associated injuries

Knowledge

- o Surgical anatomy relative to fractures, nerves and associated structures
- o Mechanisms of vascular injury (penetrating, blunt and iatrogenic)
- o Low energy and high energy transfer injury
- o Pathophysiology of trauma, muscle ischaemia and shock lung
- o Pathophysiology of traumatic A-V fistula
- o Investigations for bleeding/ischaemia (Duplex, CTA, on-table arteriography)
- o Operative approach to specific Injuries - cervical, thoracic, abdominal & limb
- o Combined arterial and venous injuries
- o Combined fractures and nerve injury

Clinical Skills

- o Symptoms and signs of acute arterial / venous injury
- o Investigation (ABPI, Duplex & angiography)
- o Assessment of multiply injured patient
- o Manage systemic effects of arterial trauma (e.g.rhabdomyolysis)

Technical Skills

- o Arrest haemorrhage by pressure, pack & tourniquet
- o Recognise and treat sucking chest wound and Chest drain
- o Proximal vascular control
- o Emergency thoracotomy
- o Ligation, Lateral suture repair, End to end anastomosis, Interposition graft, Panel / spiral grafts & Fasciotomies
- o Shunts
- o On-table arteriography
- o Endovascular balloon control embolisation
- o Insertion of covered stents

3. CHRONIC LOWER LIMB ISCHAEMIA

Objective

- o Management of the chronically ischaemic lower limb, including intervention

Knowledge

- o Anatomy and embryological development of arteries supplying the lower limb
- o Pathology of atherosclerosis, thrombosis and complications
- o Pathology of non –atherosclerotic arterial conditions (e.g.fibromuscular dysplasia, Buerger’s disease, vasculitis and pyoderma gangrenosum)
- o Vascular anomalies (e.g. persistent sciatic artery, cystic adventitial disease and popliteal entrapment)
- o Role of medical treatment/exercise therapy
- o Wound dressings & VAC

Clinical Skills

- o Selection for revascularization or amputation
- o Management of postoperative wound infection and graft complications
- o Graft surveillance
- o Amputation level selection
- o Rehabilitation after amputation
- o Lower limb prostheses

Technical Skills

- o Exposure of infrarenal aorta, iliac, femoral, popliteal, tibial and pedal vessels
- o Aorto-iliac & aorto-femoral bypass
- o Axillo-femoral bypass
- o Femoral endarterectomy and patch
- o Ilio-fem and fem-fem bypass
- o Above and below-knee fem-popliteal bypass
- o Distal bypass (AT, PT, peroneal & pedal)
- o Vein preparation - in-situ/reversed/arm vein/SSV Vein & cuff / patch
- o Intra-operative assessment with Doppler and angiography
- o Wound debridement/VAC placement
- o Angioplasty/stenting - aorta/iliac/SFA/popliteal/tibial
- o Sartorius muscle flap
- o Digital/ray amputation
- o Transmetatarsal/transtibial,Burgess, skew/through knee/above knee amputation & Hindquarter amputation

4. VASCULAR COMPLICATIONS OF DIABETES

Objective

- o Assessment and management of patients with complications of diabetes affecting the leg/foot

Knowledge

- o Anatomy of the foot
- o Complications of diabetes affecting the foot including neuropathy, ulceration, osteomyelitis and Charcot
- o Investigations (X-ray, ultrasound & MR of foot, arteriography)
- o Prevention of complications
- o Orthotic devices and principles of offloading
- o Interpretation of microbiology data and selection of antibiotics
- o Emergency treatment for infection
- o Revascularisation procedures

Clinical Skills

- o Explanation of principles of foot care to diabetic patients
- o Examination of diabetic foot/ulceration
- o ABPI, pole test, 10g monofilament test & Setting up a sliding scale

Technical Skills

- o Surgical debridement of foot Wound care including VAC

5. VASCULAR DISEASE OF THE UPPER LIMB

Objective

- o Ability to recognise and manage:
 - (i) Acute upper limb ischaemia
 - (ii) Chronic upper limb ischaemia and
 - (iii) Thoracic outlet syndrome

Knowledge

- o Anatomy Upper limb vasculature, Upper limb neurology, Thoracic outlet
- o Pathology - Thromboembolic disease, Atherosclerotic disease, Thoracic outlet syndrome, Subclavian steal syndrome, Vasospastic disease & Trauma
- o Management - Conservative, Pharmacological (anticoagulant/prostacyclin and Endovascular (angioplasty/stent) and Surgical (rib resection, embolectomy & bypass)

Clinical Skills

- o Take a relevant history and examine the upper limb vessels and nerves including provocation tests
- o Role of Doppler, duplex ultrasound, CT, MRA and conventional angiography.
- o Selection for surgical/endovascular intervention

Technical Skills

- o Exposure of subclavian, vertebral, axillary, brachial and radial arteries

- o Brachial embolectomy
- o Subclavian aneurysm repair
- o Subclavian to brachial bypass
- o Subclavian transposition
- o Subclavian to carotid bypass
- o Excision of cervical rib
- o Thoracic outlet decompression (supraclavicular, infraclavicular and transaxillary approaches)
- o Intra-operative arteriography and thrombolysis
- o Subclavian artery angioplasty/ stenting

6. HYPERHYDROSIS

Objective

- o Assessment and management of patients with hyperhidrosis (Palmar and Axillary)

Knowledge

- o Anatomy and physiology of sympathetic nervous system
- o Pathophysiology of hyperhidrosis
- o Treatment - Antiperspirants, Iontophoresis, Open/thoracoscopic Sympathetomy & Botox

Clinical Skills

- o History and examination
- o Management strategy

Technical Skills

- o Axillary Botox therapy
- o Open/Thoracoscopic Sympathetomy
- o Axillary curettage

7. VASOSPASTIC DISORDERS AND VASCULITIS

Objective

- o Assessment and management of patients with vasospastic disorders (primary and secondary) and vasculitis

Knowledge

- o Anatomy and physiology of sympathetic nervous system
- o Pathophysiology of primary and secondary vasospastic disorders (e.g. Reynaud's disease, thoracic outlet compression, Vibration White Finger,

Connective tissue disease - systemic sclerosis, SLE, rheumatoid arthritis), Vasculitis (Buerger's disease, Takayasu's, giant cell arteritis, PAN, HIV, TB)

- o Investigations (Cold provocation, blood tests, nail-fold capillaroscopy)
- o Treatment options (Cold avoidance, smoking cessation, vasodilators - e.g. calcium channel blockers), digital sympathectomy, chemotherapy & retroviral therapy)

Clinical Skills

- o History and examination Management strategy
- o Skin biopsy
- o Digital Sympathetomy
- o Thoracic outlet decompression

8. CAROTID ARTERY DISEASE

Objective

- o Assessment and management of patients with Cerebrovascular disease
- o Surgical management of patients with carotid artery territory symptoms

Knowledge

- o Anatomy and pathophysiology of stroke
- o Classification of stroke
- o Stroke severity score
- o Definition of TIA and differential diagnosis
- o Etiology and epidemiology of stroke
- o Guidelines for management of hypertension and hyperlipidaemia
- o Indications and use of investigations (CT/A, MRI/A, carotid duplex, echocardiogram)
- o Indications for medical or interventional treatment
- o Acute intervention including thrombolysis
- o Stroke prevention (antiplatelets, anticoagulants)
- o Selection for carotid endarterectomy and stenting
- o Carotid body tumours
- o Carotid dissection and Carotid trauma

Clinical skill

- o Medical management (antiplatelet agents, hypertension, hyperlipidaemia)
- o Communication of risks and benefits of intervention
- o Assess post-operative complications (stroke, bleeding, airway obstruction, cranial nerve injury)

- o Cervical block - Standard and retro jugular approach
- o Standard and eversion endarterectomy
- o Use of carotid shunts
- o Distal intimal tacking sutures
- o Primary and patch closure
- o Use and interpretation of intra-operative quality control:(angioscopy, duplex ultrasound or completion arteriography)
- o Re-do carotid endarterectomy
- o Placement of guide wire and catheter
- o Placement of cerebral protection device and Endovascular stent

9. ANEURYSM - ELECTIVE

Objective

- o Assessment and management of elective aneurysms

Knowledge

- o Anatomy of aorta and main branches
- o Pathology of aortic aneurysms (atherosclerotic inflammatory, mycotic, collagen disorders, post-dissection & vasculitic)
- o Aortic dissection & Thoraco-abdominal aneurysms
- o Pathology of other aneurysms (popliteal, visceral, carotid, subclavian and false aneurysms)
- o Investigation – US, CT A, MRA and PET
- o Treatment options - medical, open, EVAR/TEVAR & hybrid)

Clinical Skills

- o History and examination
- o Assessment of co-morbidity (cardio-respiratory/renal)
- o Endovascular planning
- o Ability to recognise/manage post-operative complications: bleeding, thrombosis, embolism, organ failure, endoleak & infection

Technical Skills

- o Open repair - Supra-renal AAA repair, Juxta-renal AAA repair, Infrarenal AAA repair, Inflammatory AAA repair & Internal iliac aneurysm repair
- o Thoraco-abdominal aneurysm -.open repair
- o Thoraco-abdominal aneurysm - hybrid repair
- o Popliteal aneurysm repair
- o Visceral aneurysm repair
- o Carotid aneurysm repair

- o Subclavian aneurysm repair
- o Repair of femoral false aneurysm
- o Re-operation for infected graft
- o Endovascular repair infrarenal AAA
- o Internal iliac artery/aneurysm coiling
- o Aorto-uniliac stent graft, iliac occluder & crossover graft
- o Juxtarenal or suprarenal AAA – fenestrated /branched stent
- o Thoracic aneurysm/dissection stent graft
- o Correction of endoleak
- o Stenting of peripheral/visceral aneurysm

10. ANEURYSM - EMERGENCY

Objective

- o Assessment and management of emergency aneurysms

Knowledge

- o Risk factors for aneurysm rupture
- o Appropriate/timely investigation of an emergency aneurysm (acute/ruptured)
- o Open and endovascular treatment options
- o Surgical methods of immediate aortic control-supracoeliac and infrarenal

Clinical Skills

- o History and examination
- o Assessment of co-morbidity
- o Select patients for conservative management, open/endovascular repair
- o Recognise/manage complications

Technical Skills

- o Open repair ruptured infrarenal AAA
- o Suprarenal/supracoeliac clamp
- o Femoral thrombectomy and or additional lower limb revascularisation
- o Balloon control of aorta
- o Endovascular repair of ruptured infrarenal AAA
- o Endovascular stenting of acute aortic dissection
- o Endovascular stenting of acute aortic dissection
- o Aorto-uniliac stent graft, iliac occluder and crossover graft

11. VASCULAR ACCESS (VA)

Objective

- o To describe need for VA, common methods of VA, establish VA and manage complications of VA

Knowledge

- o Anatomy of upper and lower limb arteries and veins
- o List indications for VA
- o Knowledge of methods of renal support; advantages and disadvantages
- o Physiology of arterio-venous fistulae
- o Knowledge of conduit material
- o List complications of VA
- o Knowledge of preoperative investigations including ultrasound

Clinical Skills

- o Preoperative assessment and choice of VA
- o Arrange appropriate investigations
- o Ultrasound assessment of patient needing vascular access

Technical Skills

- o Radiocephalic AVF
- o Brachiocephalic fistula
- o Basilic vein transposition AV fistula
- o Create forearm loop graft
- o Create thigh loop graft
- o Saphenous vein transposition AV fistula
- o On table fistulogram/angioplasty
- o Graft thrombectomy and revision
- o Ligation/excision of fistula or graft
- o DRIL or other salvage procedure
- o Complex revision procedures
- o Percutaneous fistulography and endovascular intervention
- o Ultrasound guided cannulation of jugular vein and femoral artery
- o Insertion of central venous dialysis catheter
- o Insertion of peritoneal dialysis catheter

12. RENOVASCULAR DISEASE AND TRANSPLANTATION

Objective

- o Knowledge and management of vascular problems related to renal disease and vascular surgical problems in patients with renal disease and renal transplantation

Knowledge

- o Renal & Reno-vascular anatomy
- o Role of kidney in control of blood pressure
- o Role of kidney in calcium homeostasis
- o Pathophysiology of chronic kidney disease
- o Pathophysiology of acute kidney injury
 - Pre-renal: shock, trauma, sepsis, atherosclerosis
 - Renal: intrinsic renal disease, toxins
 - Post renal: obstruction, stone, tumour

Clinical Skills

- o Pre-operative assessment
- o Arrange appropriate investigations
- o Role of CT angiography in assessing renal disease
- o Indications for renal angiography/angioplasty
- o Indications for retrograde ureteric imaging
- o Indications for isotope renography
- o Indications for selective renal vein sampling
- o Indications for renal biopsy

Technical Skills

- o Open approach to kidney
- o Laparoscopic approach to kidney
- o Exposure of renal vessels
- o Renal artery endarterectomy/bypass
- o Open surgical nephrectomy
- o Radiological access to renal arteries
- o Renal artery embolisation
- o Renal artery angioplasty
- o Living kidney donor nephrectomy
- o open/laparoscopic Renal auto transplant
- o Renal allotransplant

- o Transplant nephrectomy

13. MESENTERIC VASCULAR DISEASE

Objective

- o Assessment and management of patients with acute and chronic mesenteric ischaemia

Knowledge

- o Anatomy of mesenteric arterial and venous system
- o Physiology of mesenteric vasculature
- o Pathophysiology of mesenteric ischaemia
- o Presentation of mesenteric vascular disease - acute and chronic
- o Investigation - Mesenteric angiography, CT
- o Treatment - Medical, surgical, endovascular
- o Complications

Clinical Skills

- o History and examination of acute and chronic presentation
- o Resuscitation
- o Interpretation of investigations
- o General management

Technical Skills

- o Radiological intervention (lysis, angioplasty, stenting)
- o Mesenteric thromboembolectomy
- o Mesenteric bypass

14. SUPERFICIAL VENOUS DISEASE

Objective

- o Assessment and management of varicose veins, including recurrent veins and complications

Knowledge

- o Anatomy of the superficial venous system
- o Physiology of venous dynamics and Graduated support
- o Pathology of superficial venous incompetence, Neovascularisation, Recanalisation and Pelvic venous reflux
- o Complications of venous hypertension (Oedema, Lipodermatosclerosis, ulceration, bleeding & recurrence)

Clinical Skills

- o Presenting symptoms and complications
- o Examination varicosities and venous incompetence
- o Identify complications

- o Interpretation of venous duplex
- o Interpretation of venography
- o Interpretation of plethysmography
- o Management options (conservative, sclerotherapy, endovenous thermal ablation & surgery)

Technical Skills

- o Apply compression bandage
- o Injection sclerotherapy
- o Truncal foam sclerotherapy
- o Cannulate long and short saphenous veins under US control
- o Endovenous thermal ablation (EVLTVNUS)
- o Surgery (multiple phlebectomies, sapheno-femoral junction ligation, sapheno-popliteal junction ligation, long saphenous vein stripping)
- o Recurrent varicose vein surgery

15. DEEP VENOUS THROMBOSIS

Objective

- o Assessment and management of patient with deep venous thrombosis

Knowledge

- o Anatomy of deep veins - lower limb / pelvis
- o Pathophysiology of thrombosis and DVT
- o Management of uncomplicated DVT
- o Early / late complications of DVT
- o Thrombophilia
- o Thromboprophylaxis
- o Investigations(Ultrasound, duplex, V/Q scans, CTPA)
- o Indications for intervention (caval filters, thrombolysis and surgical thrombectomy)

Clinical Skills

- o History and examination
- o Investigation (Duplex, interpretation MRV and CTPA)

Technical Skills

- o Endovenous therapy (thrombolysis)
- o Venous thrombectomy
- o Insertion and removal of caval filter

16. DEEP VENOUS INSUFFICIENCY

Objective

- o Assessment and management of patient with deep venous insufficiency

Knowledge

- o Pathology of deep venous insufficiency (DVT, valvular dysfunction, valvular agenesis)
- o Management options (compression systems, valvuloplasty, valve transplant, bypass & amputation)

Clinical Skills

- o History - identify risk factors
- o Examination - diagnose complications
- o Investigation – Duplex, venography & plethysmography

Technical Skills

- o Apply compression bandage
- o Biopsy of leg ulcer
- o Perforator ligation
- o Deep venous reconstruction - bypass (e.g. Palma), Iliac venous stent

17. LYMPHOEDEMA

Objective

- o Assessment and management of patients with lymphoedema

Knowledge

- o Anatomy, Physiology and Pathophysiology of lymphatic system
- o Classification of lymphoedema (primary and secondary)
- o Clinical features
- o Complications - chronic effects.
- o Investigation – lymphoscintigraphy, lymphangiogram, CT/ MRI
- o Management (manual compression, compression bandaging, compression hosiery, surgical options)

Clinical Skills

- o History and examination
- o Interpretation of investigations
- o Management plan

Technical Skills

- o Application of compression bandage

- o Treatment of lymphoceles and lymphatic leaks

VI. TEACHING METHODOLOGY

STRUCTURE OF FACULTY

1. Clinical Evaluation Index
2. Case Based Discussion
3. Performance Based Assessment
4. Multi Source Feedback
5. DOPS- Direct Observation Of Procedural Skills

VII. RESEARCH WORK:

- ❖ The candidate will be trained in the ability to

- ✓ Frame a research question.
- ✓ Plan a study to answer the question.
- ✓ Collect the relevant information and
- ✓ Evaluate appropriately the collected data to draw a conclusion.

- The candidate should become conversant with the reporting of these results as a research paper in journals and as a presentation in conferences.

Students should compulsorily attend the Research Methodology workshop conducted by the University within the first six months of M.Ch. Course.

VIII. LOG BOOK:

- ❖ The candidate must maintain a log book of all his/her activities with respect to:

1. Bio-data.
2. Complete list of postings with periods and dates.
3. Complete list of all the inpatient cases managed by him/her directly.
4. List of important emergency cases and interdepartmental consultations attended by him.
5. List of diagnostic and therapeutic procedures including surgeries assisted or performed.
6. Summaries of some important emergency and elective cases managed by them.
7. List of case presentations, postgraduate seminars, journal reviews and other important academic activities.

8. List of abstracts and papers presented in Scientific Society Meetings, Conferences, Clinico-pathological conferences, etc.
9. Research projects completed.
10. Papers published or sent for publication.
11. Teaching assignments performed and
12. Any other relevant details.

- The Postgraduate student of a Postgraduate Degree Course in Super specialties shall maintain Log Book of the work carried out by them and the training programme undergone during the period of training including details of surgical operations assisted or done independently.
- The Log Book shall be checked and assessed by the faculty members imparting the training and reviewed each week by the guide and chief.
- Periodical evaluation of Log Book to be done by the Head of the Department as per 52nd SAB.

- ❖ The Evaluation of the candidates in both theory and practical aspects will help the candidate in the improvement of his/her knowledge skills & attitude.

IX. COMPETENCY ASSESSMENT:

❖ Overall:

1) Communication / Commitment / Contribution / Compassion towards patients and Innovation	-	10 Marks
2) Implementation of Newly learnt techniques	-	10 Marks
3) Documentation of case sheets / discharge Summary / Review	-	10 Marks
4) Number of cases presented in Clinical Meetings/Journal Clubs/ Seminars / Papers presented in Conference	-	10 Marks
5) No. Of Medals/ Certificates won in the conference / Quiz Competitions and other academic meetings with details	-	10 Marks
Total		----- 50 Marks -----

- ❖ **Assessment:**

I	- February	-	First Year
II	- August	-	First Year

III	- February	-	Second Year
IV	- August	-	Second Year
V	- February	-	Third Year
VI	- May	-	Third Year

❖ **VIVA** including competency assessment - 100 Marks (50+50)

X. THEORY EXAMINATION:

Paper I - Basic sciences as applied to Vascular Surgery

Paper II - Vascular Surgery

Paper III - Vascular & Endo Vascular Surgery

Paper IV - Recent advances in Vascular Surgery

❖ **Each paper will contain:**

✓ Essay questions (2 X 15) = 30 Marks

✓ sShort Notes (10 X 7) = 70 Marks

Total = 100 Marks

XI. PRACTICAL SCHEME:

Particulars	Time for candidate to examine the cases	Time for examiners to question the candidates	Maximum Marks
<i>Long Case</i>	<i>1 Case x 60 Minutes</i>	<i>60 Minutes</i>	<i>100</i>
<i>Short Case</i>	<i>2 Cases x 15 Minutes</i>	<i>30 Minutes</i>	<i>100</i>
<i>Ward Rounds</i>	<i>3 Patients x 10 Minutes</i>	<i>30 Minutes</i>	<i>100</i>
<i>OSCE</i>	<i>5 Stations x 3 Minutes</i>	<i>15 Minutes</i>	<i>50</i>
<i>Viva Voce</i>		<i>15 Minutes</i>	<i>100</i>
<i>Log Book</i>			<i>50</i>
<i>Total</i>			<i>500</i>

❖ As per Medical Council of India Post Graduate Medical Education Regulations 2000 (amended up to 10th August 2016) Clause 13.9, a Postgraduate student of a Postgraduate degree Course in broad specialties/Super Specialties would be required to present one poster presentation to read one paper at a National/State conference and to present one Research paper which should be published/accepted for publication/sent for publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate Degree Examination.

- ❖ Apart from Poster/Oral paper presentation in National/State conferences, the Research paper published by the candidate in the University Journal of Medical Sciences will be considered as equivalent to the Research Paper as mentioned in 13.9. Clause. Case Reports can also be published in University Journal of Medical Sciences but case reports will not be considered as Research Paper.
- ❖ The candidate can also present Research Paper as per Clause 13.9 of Post Graduate Education Regulation 2000, and if the article sent for publication by the candidate as primary author or corresponding author which has not yet been published/accepted for publication, the candidate should submit a letter from the HOD, stating that the article sent for publication is of publishable merit and the proof of the Research Article submitted to the Journal for publication should be sent to the university forwarded through the HOD [as per 53rd SAB]
- ❖ *"The student can submit articles for the University journal anytime from the time of registration in the University till 6 months prior to theory examination".*

XII. OSCE - 5 STATIONS:

1. Pathology slide.
2. Clinical situation – interpretation.
3. Instrument.
4. Imaging.
5. Drug – Usage/indications.

XIII. RECOMMENDED READING FOR THE VASCULAR CURRICULUM:

1. *Vascular and Endovascular Surgery: 4th Edition. Beard J.D., Gaines P.A. (Eds) Saunders Elsevier 2009.*
2. *Atlas of Vascular Disease: 2nd Edition. Creager M. A., Braunwald E. (Eds.) Current Medicine Inc, 2003.*
3. *Atlas of Vascular Surgery: Operative procedures. Ouriel K., Rutherford R.B. (Eds.) W.B. Saunders, 1998.*

4. *Atlas of Vascular Anatomy: An angiographic approach.* Uflacker R., Lippincott Williams & Wilkins, 2006.
5. *Peripheral Arterial Disease:* Mohler E., Jaff M.(Eds) ACP, 2008.
6. *An Introduction to Vascular Biology: 2nd Edition.* Halliday A. W., Hunt B. J., Poston L., Schachter M. (Eds.) Cambridge University Press, 2002 Final Stage.
7. *Vascular Surgery: 8th Edition.* Rutherford R.B. (Ed.), Saunders, 2005.
8. *Comprehensive Vascular and Endovascular Surgery: 2nd Edition.* Hallet J.W., Mills J.L., Earnshaw J.J., Reekers J.A., Rooke TM (Eds), Mosby Elsevier, 2009.
9. *Pathways of Care in Vascular Surgery* Beard J.D., Murray S. (Eds), TFM Publishing Ltd, 2002.
10. *Rare Vascular Disorders. A Practical Guide for the Vascular Specialist:* Parvin S.D., Earnshaw J.J. tfm Publishing Ltd, 2005.
11. *Abrams' Angiography: Interventional Radiology: 2nd Edition.* Baum S. and Pentecost M. J. (Eds.) Lippincott Williams & Wilkins. 2006.
12. *Grainger & Allison's Diagnostic Radiology, 5th Edition.* Adam a et al. (Eds.), Churchill Livingstone, 2008.
13. *CT and MR Angiography: Comprehensive Vascular Assessment.* Rubin G. D. and Rofsky N. M. (Eds.) Lippincott Williams & Wilkins, 2008.
14. *Introduction to Vascular Sonography: 5th Edition* Zweibel W. (Ed.) W.B. Saunders, 2005.
15. *Connective Tissue Diseases.* Belch J.J.F. and Zurier R.B. (Eds.) Chapman and Hall, 1995.
16. *Recent Advances in Thrombosis and Haemostasis* Tanaka K. and Davie E.W. (Eds.) Springer, 2008.
17. *The Foot in Diabetes (3rd Edition)* Boulton A.J.M., Connor H., Cavanagh P.R.C. (Eds.) John Willey, 2000.
18. *Amputation Surgery and Lower Limb Prosthetics.* Murdoch G. (Ed.) Blackwell, 1988.
19. *The Vein Book.* Bergan J. J. (Ed.) Elsevier, 2007.
20. *HANDBOOK OF venous disorders* gloviski

****Note:** The editions are as applicable and the latest editions shall be the part of the syllabi.

RECOMMENDED COURSES:

1. Specialty Skills in Vascular Surgery
2. Amputations

3. Advanced Skills in Vascular Surgery
4. Endovascular Aneurysm Repair Planning
5. Vascular Ultrasound Course
6. Radiation Protection Training Course.

XIV. RECOMMENDED WEBSITES/JOURNALS:

➤ A few of the more useful websites are listed below.

1. *British Society of Interventional Radiology:* <http://www.bsir.org>
2. *Cardiovascular and Interventional Radiological Society of Europe:*
<http://www.cirse.org>
3. *European Board of Vascular Surgery:* <http://www.uemsvascular.com>
4. *European Journal of Vascular and Endovascular Surgery:*
<http://www.sciencedirect.com/esvs>
5. *European Society for Vascular Surgery:* <http://www.esvs.org>
6. *European Venous Forum:* <http://www.europeanvenousforum.org>
7. *Society for Vascular Surgery (North America):* <http://www.vascularweb.org>
8. *Vascular Education:* <http://www.vasculareducation.com> Approved October 2012
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9. *Vascular Society of Great Britain and Ireland:* <http://www.vascularsociety.org.uk>
10. *Indian journal of vascular surgery.*
11. *National medical journal of India*
12. *Journal of vascular surgery*
13. *Nejm*
14. *Endovascular today*
15. *European Journal of cardiothoracic and vascular surgery*
16. *ESVS Journal.*

M.Ch – ENDOCRINE SURGERY

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI
Syllabus - M.Ch. – ENDOCRINE SURGERY

Introduction:

The following is a curriculum for Endocrine Surgeons outlining the knowledge and skill objectives that should be taught, learned, and demonstrated by the completion of Endocrine surgery. A Post graduate successfully demonstrating all of these objectives will have the appropriate background to perform common endocrine surgical procedures commensurate with his/her skill and expertise.

1.AIMS:

At the end of the course Endocrine the student should have acquired:

1. Broad understanding of the principles of basic medical sciences related to Endocrine Surgery.
2. Ability and skill to perform and interpret investigative procedures related to the Endocrine Surgery.
3. Skills in clinical diagnosis, planning of investigation and manage common conditions in the Endocrine Surgery by relevant current therapeutic methods.
4. Capabilities to take independent decisions in emergency situations perform required procedures in Endocrine and manage complications.
5. Competence in intensive care with practical knowledge of work with resuscitative and monitoring equipments.
6. Ability to critically appraise published literature, interpret data and to broaden his/her knowledge by keeping abreast with modern developments in the Endocrine Surgery.
7. Ability to teach Post-graduates, undergraduates and Nursing students in the basic management of the diseases in Endocrine Surgery.
8. Ability to get acquainted with allied and general clinical disciplines to ensure appropriate and timely referral.
9. Ability to conduct research.
10. Ability to become a consultant and capability of organizing Endocrine Surgery Departments.

2. OBJECTIVES:

Demonstrate knowledge and understanding of endocrine gland anatomy and physiology, both the normal and pathological states.

- Demonstrate the ability to diagnose clinical endocrinopathies associated with endocrine surgical diseases.

- Develop knowledge of the inherited endocrine disorders and understand the role of genetic counseling and testing.
- Have an appreciation of the current controversies and current areas of research in the literature within endocrine surgical diseases.
- Demonstrate the ability to apply this knowledge and safely perform the appropriate surgical operation for a given endocrine surgical disease.
- Develop ability to think critically and communicate effectively with patients and referring physicians.
- Develop Appreciation of humanistic and ethical aspects.
- Ability to work as part of a team as Endocrine disorders involves multidisciplinary management.

3.THEORY SYLLABUS:

(I).Pituitary

1. Hypothalamus and pituitary anatomy and its relation to adjacent structure
2. Pituitary embryogenesis
3. Physiology and secretion of various hormones like
 - *Growth hormone
 - *TSH
 - *ACTH
 - *Prolactin
 - *LH
 - *FSH
 - *Melanocyte Stimulating Hormone
4. Physiology and secretion of insulin like growthfactor.
- 5.Pathology of various pituitary adenomas and prognostic clinical, pathological classification of pituitary endocrine tumour.
6. Diagnosis of various pituitary diseases like
 - *Acromegaly
 - *Prolactinomas
 - *Cushings disease
 - *TSH producing adenoma
7. Pituitary tumour management in pregnancy
8. Pituitary apoplexy

(II).Thyroid

1. Demonstrate normal thyroid anatomy in a cadaver or in the operating room, including the thyroid gland, its vascular supply and venous drainage,

the parathyroid glands, recurrent laryngeal nerves, strap muscles, and platysma.

2. Normal variants in recurrent laryngeal nerve anatomy including frequency

3. Normal thyroid embryogenesis and descent.

4. Normal thyroid hormone synthetic pathway including iodine metabolism and feedback mechanisms.

5. Impact of specific medications on the thyroid hormone synthetic pathway and thyroid function.

6. Impact of aging and various diseases of the thyroid hormone synthetic pathway and thyroid function.

7. Appropriate thyroid function testing for the following clinical scenarios, including interpretation of predicted test results:

- Thyroid nodule
- Goiter
- Hyperthyroidism
- Hypothyroidism
- An algorithm development that includes pertinent history, examination findings, and diagnostic evaluation of:
 - A palpable thyroid nodule
 - A nodule discovered on ultrasound performed for thyroid pathology

8. Recognition, evaluation, and management of the following early postoperative complications:

- Hematoma
- Hypocalcaemia

9. Outpatient management of the following postoperative conditions

- Thyroid hormone replacement, postoperative
- Postoperative hypocalcaemia
- Postoperative voice changes

10. Algorithms for the evaluation and treatment of:

- Well-differentiated thyroid cancer
- Medullary thyroid cancer
- Thyroid lymphoma
- Anaplastic thyroid cancer

11. Risk factors for well-differentiated thyroid cancer, medullary thyroid cancer, and anaplastic thyroid cancer.

12. Algorithms for the evaluation and treatment of hyperthyroidism due to Graves' disease, toxic nodule, medications, pregnancy.

13. Clinical presentation of thyroid storm and outline the treatment of thyroid storm.

14. Algorithm development for the evaluation and management of nontoxic multinodular goiter, including substernal goiter with and without airway involvement.
15. Pathophysiology of:
 - Multinodular goiter
 - Grave's disease
 - Thyroid cancer
16. Operative approaches to thyroid pathology
17. Staging and prognosis in thyroid cancer
18. Recognition and treatment of common postoperative complications
 - Hematoma
 - Hypocalcemia
 - Thyroid storm
 - Voice changes
19. Complete evaluation and management of patients with thyroid cancer (papillary, follicular, medullary, anaplastic lymphoma) including:
 - Preoperative evaluation including radiographic studies
 - Operative approaches including discussion of lobectomy vs. total thyroidectomy
 - Indications for and extent of neck dissection
 - Incidental finding of cancer in resected specimen
 - Metastatic thyroid cancer
 - Large remnant in patient with thyroid cancer
 - Tracheal invasion
 - Esophageal invasion
 - Postoperative treatment, surveillance, and monitoring
20. Complete evaluation and management of nontoxic multinodular goiter and substernal goiter
21. Approaches for reoperative thyroid surgery
22. Management of intraoperative recurrent nerve injury

(III).Parathyroid Disease

1. Normal parathyroid anatomy in a cadaver or in the operating room, including typical gland locations, blood supply, and relationship to the recurrent laryngeal nerves and other adjacent structures.
2. Normal parathyroid embryogenesis and descent. Describe how this affects ectopic gland location.

3. Normal calcium metabolic pathway including vitamin D metabolism, parathyroid hormone production and regulation, and calcitonin production and regulation.
4. Impact of specific medications and medical conditions on serum calcium and calcium metabolism.
5. Impact of aging on calcium metabolism.
6. Evaluation and treatment of life-threatening hypercalcemia.
7. Appropriate evaluation for the following clinical scenarios, including interpretation of expected test results:
 - Primary hyperparathyroidism
 - Secondary hyperparathyroidism
 - Tertiary hyperparathyroidism
 - Hypercalcemia associated with malignancy
 - Hypercalcemia associated with medications
8. Algorithm Development that includes pertinent history, examination findings, and initial diagnostic evaluation of:
 - Asymptomatic primary hyperparathyroidism
 - Symptomatic primary hyperparathyroidism
 - Normocalcemic Hyperparathyroidism
9. Recognition, evaluation, and management of the following postoperative complications:
 - Hematoma
 - Hypocalcemia
 - Voice changes
10. Demonstration of typical locations for ectopic parathyroid glands in a cadaver or the operating room .
11. Current Consensus guidelines for surgical treatment of asymptomatic patients. Initial evaluation of patients with asymptomatic hyperparathyroidism being considered for observation including an outline of the appropriate follow up of these patients including diagnostic evaluation, frequency of testing, and

anticipated outcomes. Describe which patients are appropriate candidates for nonoperative management of hyperparathyroidism.

- Indications for and interpretation of results of bone density testing.
- Outpatient follow up after parathyroidectomy.
- An algorithm for the preoperative localization of parathyroid adenoma in patients with primary hyperparathyroidism. Discuss the rationale and accuracy of the various localizing strategies and tests.
- An algorithm for intraoperative confirmation of successful parathyroidectomy during full neck exploration and minimally invasive parathyroidectomy.
 - Differences between a bilateral 4- gland exploration, a unilateral exploration and a focused exploration
- Prevention, recognition, and management of hungry bone syndrome after parathyroidectomy..

12. A diagnostic and treatment pathway for patients with non-MEN familial hyperparathyroidism Describe the technique of cryopreservation and its role in the treatment of patients with multigland disease or during reoperative parathyroid surgery.

13. Interpretation of intraoperative PTH monitoring results and their correlation with postoperative eucalcemia.

14. Complete evaluation and management of patients with parathyroid cancer including:

- Preoperative evaluation including radiographic studies
- Operative approaches
- Extent of resection
- Postoperative treatment, surveillance, and monitoring

15. Different techniques of focused parathyroidectomy including:

1. Mini incision open
2. Radioguided
3. Video-assisted and endoscopic approaches

16. Complete evaluation and management of recurrent or persistent hyperparathyroidism, including imaging studies and selective venous sampling.
17. Regional anesthesia for minimally invasive parathyroidectomy.
18. Treatment pathway for MEN 1 and 2A patients, including the order in which the different manifestations should be treated.

IV. Adrenal Disease

1. Embryology, histology, and physiology of the adrenal gland, distinguishing differences in the cortex and medulla.
2. Anatomy of the adrenal gland, including the arterial supply, venous drainage and relationship to adjacent structures.
3. Biosynthesis and physiologic effects of glucocorticoids, mineralocorticoids, and adrenal sex steroids.
4. Catecholamine synthetic pathway.
5. Etiologies, common signs and symptoms, and clinical presentations of Cushing's syndrome.
6. Diagnostic evaluation of hypercortisolism.
7. Protocol for perioperative steroid use in a patient taking exogenous steroids.
8. Etiologies, clinical presentation, evaluation and management of adrenal insufficiency.
9. Complications of adrenalectomy, including adrenal insufficiency and the diagnosis, treatment, and causes.
10. Signs, symptoms, and evaluation of primary hyperaldosteronism.
11. Differentiate between primary and secondary hyperaldosteronism.
12. General attributes of adrenocortical carcinoma.
13. Physiology, clinical presentation, treatment, and preoperative preparation of pheochromocytoma.
14. Perform a thorough physical examination and be familiar with signs of hormone excess. (hirsutism, striae, acne, facial changes, clitoral hypertrophy, etc)

15. Diagnostic pathway of ACTH dependent vs. ACTH independent Cushing's syndrome, including the role of the low and high dose dexamethasone suppression test. Understanding of normal ranges and those expected for suppression of cortisol and be familiar with the utility and role of salivary, venous and urinary cortisol assessments.
16. Localization studies available for adrenal tumors, including CT scanning, MIBG, PET scanning, and MRI.
17. Distinguish bilateral hyperplasia vs. unilateral disease in Cushing's syndrome and primary hyperaldosteronism.
18. Diagnostic algorithm for primary hyperaldosteronism.
19. Treatment and outcome for primary hyperaldosteronism in patients treated with adenoma vs. bilateral adrenal hyperplasia.
20. Diagnostic evaluation and treatment of adrenocortical carcinoma.
21. Diagnostic pathway for pheochromocytoma and review of the treatment modalities and recommendations.
22. Evaluation and treatment of an adrenal incidentaloma.
23. Etiology, diagnosis, and treatment of adrenal cystic disease.
24. Role of fine needle aspiration biopsy in the evaluation of adrenal tumors.
25. Operative approaches for adrenal surgery, including the laparoscopic trans- and extraperitoneal approaches and anterior, lateral and posterior open approaches.
26. Understanding of functioning imaging modalities for pheochromocytoma and adrenal hyperplasia (i.e., MIBG or NP 59 scanning)
27. Understanding technique involved with adrenal vein sampling; role of ACTH stimulation and cortisol assessment to document accuracy of catheter location.
28. Understanding algorithm and dosing of preoperative preparation/blockade for pheochromocytoma
29. Be familiar with medications that can alter interpretation of catecholamines (i.e. antidepressants, Tylenol, etc)
30. Congenital adrenal hyperplasia.
31. Surgical approaches to pheochromocytoma.

32. Review all the surgical options/approaches for adrenalectomy and the indications for each.
33. Intraoperative management of patients with pheochromocytoma during surgery regarding anesthetic management, surgical technique, and pre and postoperative care.
34. Distinguishing characteristics of extraadrenal pheochromocytomas.
35. Evaluation and treatment of multiple endocrine neoplasia type 2 syndrome in a patient with adrenal lesions.
36. Treatment options for a patient with malignant pheochromocytoma.
37. Steps for a safe and successful right and left laparoscopic transabdominaladrenalectomy. Be familiar with operative technique (positioning, steps of the operation)
38. Diagnosis and treatment of paragangliomas.
39. Be familiar with common complications following adrenalectomy and ways to avoid them.
40. Be comfortable with maintenance or physiologic dosing of steroids and fludrocortisone following bilateral adrenalectomy. Be comfortable with conversion of steroid supplementation.(ex: Dexamethasone, Methylprednisolone hydrocortisone)
41. Indications and technique of subtotal adrenalectomy
42. Intraoperative medical management of adrenergic crisis.

V. Gastrointestinal Neuroendocrine Tumors

Gastrointestinal neuroendocrine tumors are rare entities. Therefore, the focus of this section is on gastrointestinal hormone pathophysiology and recognition of syndromes associated with tumors producing these hormones. Because of the rarity of these tumors and syndromes, only knowledge objectives are incorporated in this section of the curriculum.

1. Site of synthesis, mechanism of action, and normal physiologic effects of the following gastrointestinal hormones
 - Gastrin
 - Insulin

- Glucagon
 - Vasoactive Intestinal Peptide
 - Somatostatin
2. Different cell types of the endocrine pancreas, their synthetic products, stimuli and inhibitors to these products, and distribution in the pancreas.
 3. Symptoms and syndromes associated with the hypersecretion of the following gastrointestinal hormones:
 - Gastrin
 - Insulin
 - Glucagon
 - Vasoactive Intestinal Peptide
 - Somatostatin
 4. Typical presentation of carcinoid tumors.
 5. Sites of occurrence of carcinoid tumors including their frequency and propensity for developing carcinoid syndrome.
 6. Pathophysiology of carcinoid syndrome.
 7. Diagnostic approach including biochemical evaluation, ancillary studies, and recommended localization methods for the following tumors:
 - Gastrinoma/ Zollinger-Ellison syndrome
 - Insulinoma
 - Glucagonoma
 - VIPoma
 - Somatostatinomas
 - Nonfunctional neuroendocrine tumors
 8. Indications for surgery, operative approaches, and expected outcomes for the following tumors:
 - Gastrinoma
 - Insulinoma
 - Glucagonoma
 - VIPoma

- Somatostatinomas
 - Nonfunctional neuroendocrine tumors
9. Understanding of diagnosis and treatment of syndrome of post gastric bypass hypoglycemia
 10. Algorithm for surgical management of carcinoid tumors based on site, size, and presence of carcinoid syndrome.
 11. Follow up of patients who have undergone resection of carcinoid tumors.
 12. Management of liver metastases of the neuroendocrine tumors.

VI. Familial Endocrinopathies

Familial endocrinopathies are rare entities; however they have important screening and treatment implications. Because of their rarity only knowledge objectives are incorporated in this section of the curriculum.

VII. Multiple Endocrine Neoplasia Syndromes

1. Components of each of the following multiple endocrine neoplasia (MEN) syndromes, their mode of inheritance, and the frequency of expression of each component:
 - MEN type 1
 - MEN type 2A
 - MEN type 2B
2. Diagnostic approach for each of the MEN syndromes.
3. Treatment, including timing of operative approach, for each component of the following syndromes:
 - MEN type 1
 - MEN type 2A
 - MEN type 2B
4. Recommended genetic testing for patients suspected of having one of the MEN syndromes.

5. Recommended screening for kindred of patients with the different MEN syndromes.
6. Recommended follow up of patients with the different MEN syndromes.
7. Prognosis for each of the MEN syndromes.

VIII. Familial Medullary Thyroid Cancer

1. Mode of inheritance of Familial Medullary Thyroid Cancer (FMTC).
2. Diagnostic evaluation, including genetic testing, of FMTC.
3. Recommended treatment, including the role of prophylactic thyroidectomy, for FMTC.
3. Recommended screening for kindred of patients with the different MEN syndromes.
4. Recommended follow up of patients with FMTC.
5. Prognosis for FMTC.
6. Compare and contrast the evaluation and management of FMTC with sporadic medullary thyroid cancer.

IX. Familial Papillary Thyroid Cancer

1. Diagnostic criteria for familial papillary thyroid cancer (FPTC).
2. Mode of inheritance of FPTC.
3. Recommended screening for FPTC.
4. Recommended treatment of FPTC.
5. Recommended follow up of patients with FPTC.
6. Prognosis for FPTC.
7. Compare and contrast the evaluation and management of FPTC with sporadic papillary thyroid cancer.

X. Familial Non-MEN Hyperparathyroidism

1. Diagnostic criteria for familial non– MEN hyperparathyroidism (FHPTH).
2. Mode of inheritance of FHPTH.
3. Recommended screening for FHPTH.

4. Compare and contrast the evaluation and management of FHPTH with sporadic primary hyperparathyroidism.

XI. Familial Non-MEN Syndromes

Knowledge about the endocrine pathology and management of familial non-MEN syndromes including;

1. vonHippelLindau (VHL)Neurofibromatosis
2. Paraganglioma syndromes (SDH-B, SDH-D)
3. Cowden's Disease
4. Familial HPT
5. Jaw-Tumor Syndrome
6. Familial Medullary thyroid cancer (MTC)
7. Carney Complex
8. Carney's Triad
9. FHH

XII. Imaging Modalities:

Role and apply the appropriate utilization of the following imaging and diagnostic studies in the surgical management of endocrine surgical disease:

- Ultrasound
- CT, MRI, PET
- Scintigraphy including; radioactive iodine, meta- iodobenzylguanine [MIBG], sestamibi, Octreotide scan, NP-59 scan.
- Selective venous sampling (parathyroid and adrenal)
- Intraoperative tumor localization (gamma probe, Intra-Op U/S)

XIII. Diabetic Foot

- Anatomy of diabetic foot
- Blood supply and venous drainage of lower limb
- Physiology of insulin secretion
- Aetiology and pathology of Diabetes Mellitus and its complications
- Medical, nutritional therapy and treatment of Diabetes Mellitus
- Risk factors for diabetic foot ulceration
- Neuropathic and neuroischemic ulcer

- Patho physiology of various types of gangrene
- Neuroosteoarthropathy and charcot foot

XIV. Bariatric and Metabolic Surgery

1. Epidemiology of obesity
2. Pathophysiology of morbid obesity and the metabolic syndrome
3. Therapeutic options for morbid obesity
4. Indications for weight loss and metabolic surgery
5. The principles of perioperative management of the obese patient
5. Types of operations performed and mechanisms of action
6. Complications of metabolic surgery and their management
7. Revisional metabolic surgery
8. Long term management of the bariatric patient following surgery
9. Essential components of a bariatric service
10. Psychology of the morbidly obese patient

XV. Breast Surgery

1. Normal anatomy, physiology and lymphnode of the breast
2. Benign condition of the breast
3. Pathology, clinical features, prognostic factors and treatment of breast cancer
4. Various imaging modalities for breast cancer
5. Molecular pathology of breast cancer

XVI Bioethics

1. Respect human life and the dignity of every individual.
2. Refrain from supporting or committing crimes against humanity and condemn all such acts.
3. Treat the sick and injured with competence and compassion and without prejudice and apply the knowledge and skills when needed.
4. Protect the privacy and confidentiality of those for whom we care and breach that confidence only when keeping it would seriously threaten their health and safety or that of others.

5. Work freely with colleagues to discover, develop, and promote advances in medicine and public health that ameliorate suffering and contribute to human well being.
6. Educate the public about present and future threats to the health of humanity.
7. Advocate for social, economic, educational and political changes that ameliorate suffering and contribute to human well being.
8. Teach and mentor those who follow us, for they are the future of our caring profession.

4. CLINICAL TRAINING:

The students will be clinically trained in parent department during the 3 years course.

1. Minimum one month posting in the department of medical endocrinology
2. Minimum 15 days posting in the department of Diabetology.
3. Minimum 15 days posting in the department of Nuclear Medicine
4. Minimum 15 days posting in the department of minimal access surgery

During II year, students are encouraged to undergo special postings for learning new advanced techniques / Procedure / Skills in institutions of higher repute where the requisite facilities are available without affecting the duties of the parent department.

I. Pituitary

1. Develop skill to diagnose and treat complications of various pituitary adenomas.
2. Develop skill to interpret the MRI Brain and CT Skull bones. Develop skill to identify pituitary
3. Learn various types of complications of pharmacological agents used in various pituitary disorders
4. Learn about various surgical approaches for pituitary surgery
5. Describe the outcome of endoscopic sphenoidal pituitary surgery

II. Thyroid

1. Obtain a focused history, perform an examination, and institute the diagnostic evaluation of a patient with the following conditions:
 - Thyroid nodule

- Goiter
 - Hyperthyroidism
2. Palpate and describe a thyroid nodule
 3. Palpate and describe a goiter
 4. Identify exophthalmos
 5. Demonstrate normal anatomy in the operating room
 6. Palpate and describe a thyroid nodule
 7. Perform a fine needle aspiration biopsy of a palpable thyroid nodule
 8. Perform the initial steps in thyroid surgery, including
 - Patient positioning and marking
 - Skin incision and raising subplatysmal flaps
 - Opening strap muscles
 - Close strap muscles, platysma, and skin
 9. Perform and interpret head and neck ultrasonography
 - Identify which ultrasound equipment/probes are best used for head and neck ultrasonography.
 - Identify normal structures visualized during ultrasound of the head and neck (Thyroid, parathyroid, lymph nodes, trachea, carotid artery, internal jugular vein, inferior and superior thyroid vessels, parotids, submandibular glands)
 - Describe the echogenicity of a visualized structure as hypoechoic, isoechoic, anechoic or hyperechoic relative to the normal thyroid gland
 - Use ultrasound to identify thyroid nodules, parathyroid adenomas and adenopathy
 - Describe which features of a thyroid nodule on ultrasound are more worrisome for malignancy
 10. If possible perform an ultrasound guided fine needle aspiration biopsy of a thyroid nodule
 11. Assess vocal cord function either by flexible transnasal endoscopy or indirect laryngoscopy.
 12. Interpret the CT Neck

13. Identify the thyroid nodule, trachea, oesophagus and intra vascular structures.
14. Identify malignant features of thyroid nodule
15. Identify the neck nodes
16. Identify extra glandular infiltration and thyroid carcinoma

III. **Parathyroid Disease**

1. Obtain a focused history, perform an examination, and institute the diagnostic evaluation of a patient with hypercalcemia
2. Demonstrate normal parathyroid anatomy in the operating room at the time of parathyroidectomy or thyroidectomy.
4. Interpret a sestamibi scan.
5. Perform the following steps of parathyroidectomy (Be able to describe difference in performing a full neck exploration, minimally invasive approach, unilateral or focused)
 - Patient positioning and marking
 - Skin incision and raising subplatysmal flaps
 - Opening strap muscles
 - Close strap muscles, platysma, and skin
6. Perform a parathyroidectomy (preferably both full neck exploration and minimally invasive), including
 - Intraoperative identification and resection of adenoma
 - Intraoperative identification of normal parathyroid glands
 - Intraoperative identification of hyperplasia
7. Reimplant a parathyroid gland
8. Participate in or perform re-exploration for persistent or recurrent hyperparathyroidism.
9. Assess vocal cord function either by flexible transnasal endoscopy or indirect laryngoscopy.
10. Interpret a neck ultrasound, demonstrating the thyroid gland, adjacent structures and a parathyroid adenoma or hyperplasia.
 - Identify which ultrasound equipment/probes are best used for head and neck ultrasonography

- Identify typical locations where an abnormal parathyroid may be visualized during ultrasound of the head and neck
- Use ultrasound to identify parathyroid adenomas, hyperplastic parathyroids and learn about the ultrasound features that help differentiate them from thyroid nodules and adenopathy.
- Participate in or learn the protocol and value of performing a fine needle aspiration of a parathyroid with measurement of PTH levels on the needle washout.

IV. Adrenal Disease

1. Identify both adrenal glands in a cadaver or in the operating room.
2. Locate the adrenal glands on a CT scan
3. Identify adrenal anatomy, blood supply, and surrounding structures at the time of adrenalectomy or other operation.
4. Demonstrate operative exposure (open or laparoscopic; human, cadaver, or animal) of either adrenal gland.
5. Perform an adrenalectomy (open or laparoscopic), including patient positioning, dissection, resection, and postoperative care.

V. Gastrointestinal Neuroendocrine Tumors

1. Interpret CT Abdomen identify the pancreas, the stomach and others
2. Normal anatomy of stomach pancreas in the operating room
3. Skill to do and interpret intra operative ultrasound
4. Skill to do laparotomy
5. Skill to resect NET in the tail of the pancreas
6. Skill to do bowel resection and mesentery dissection and lymphonodes

VI. Diabetic Foot

1. Develop skill to identify the various risk factors for diabetic foot
2. Develop skill to debride the wound
3. Learn types and uses of various dressing appliances and learn the method of applying
4. Learn skills in various amputations
5. Describe the preventive and therapeutic

VII. Bariatric and Metabolic Surgery

- History and examination of the obese patient
- Interpretation of investigations in the obese patients
- Preoperative evaluation and optimization
- Assessment of the post-operative bariatric patient
- Management decisions for early and late complications of bariatric surgery

VIII. Interdepartmental Disciplines

1. Gain exposure to and / or to work with colleagues in other disciplines related to the diagnoses and treatment of endocrine surgical disease such as;

- Nuclear medicine
- Medical Oncology
- Genetics
- Interventional Radiology
- Gastroenterology
- Voice lab
- Pathology

IX. Breast Surgery

1. Interpret the various imaging modalities of breast cancer
2. Learn about various surgeries performed for breast cancer

Students are encouraged to undergo special postings for learning new advanced techniques / Procedure / Skills in institutions of higher reputation where the requisite facilities are available without affecting the duties of the parent department.

5.SKILL TRAINING:

Develop ability to do

- Video laryngoscopy
- Ultrasonogram neck
- Interpret imaging of CT & MRI of Neck, Abdomen and foot
- Develop skill to do FNAC of thyroid

- Develop skill to do ultrasound guided FNAC of thyroid
- Surgeries 1. Hemithyroidectomy
 - 2. Total thyroidectomy
- Various compartmental lymph node dissection
- Parathyroidectomy
 - o Focal and four gland exploration
- Abdominal both open and laproscopic adrenelectomy
- Laparoscopic access in the morbidly obese
- Roux en Y gastric bypass
- Insertion of laparoscopic gastric band
- Sleeve gastrectomy
- Amputation of foot and leg
- Tracheostomy

6. TEACHING METHODOLOGY:

1. Daily bedside didactic lectures by faculty
2. Monthly seminar and symposium and journal check by post graduate
3. Post graduate oriented training in the form of case discussion and ward rounds
4. Inter disciplinary meeting with departments of pathology, nuclear medicine, radiology, ENT, gastro enterology
5. Monthly departmental statistical meeting
6. Departmental morbidity and mortality meeting
7. The training will be given full responsibility of patients he will be encourage to improve and develop his decision making ability under the supervision of teacher
8. Theory examination once in six months from the first year onwards and model practical examination at the end of second year and third year.

7. RESEARCH WORK:

1. Understand the design of both clinical and basic science research studies

2. Develop a basic understanding of the statistical method applied to various study design
3. Develop a basic knowledge of molecular biology as it apply to endocrine surgical disease
4. Be able to critically apprai the medical literature
5. To develop a research question in endocrine surgical disease and pursue an appropriate research project
6. To present the work in written and oral form at conference
7. Help mentor in preview of articles submitted for publication
8. Students should compulsorily attend Research Methodology workshop conducted by the University with in first six months of M.Ch. Course.

8. LOG BOOK:

The Postgraduate student of a Postgraduate Degree Course in Super specialties shall maintain Log Book of the work carried out by them and the training programme undergone during the period of training including details of surgical operations assisted or done independently.

The Log Book shall be checked and assessed by the faculty members imparting the training.

Periodical evaluation of Log Book to be done by the Head of the Department as per 52nd SAB.

The Evaluation of the candidates in both theory and practical aspects will help the candidate in the improvement of his/her knowledge skills & attitude.

9. COMPETENCY ASSESSMENT:

Overall:

- | | | |
|---|---|----------|
| 1. Communication / Commitment / Contribution / Compassion towards patients and Innovation | - | 10 Marks |
| 2. Implementation of Newly learnt techniques | - | 10 Marks |
| 3. Documentation of case sheets / discharge Summary / Review | - | 10 Marks |
| 4. Number of cases presented in Clinical Meetings/ Journal Clubs / Seminars / Papers presented in Conference. | - | 10 Marks |

5.	No. Of Medals/ Certificates won in the conference / Quiz competitions and other academic meetings with Details.	-	10 Marks

		Total	50 Marks

Assessment	I	- February	-	First Year
	II	- August	-	First Year
	III	- February	-	Second Year
	IV	- August	-	Second Year
	V	- February	-	Third Year
	VI	- May	-	Third Year

VIVA INCLUDING COMPETENCY ASSESSMENT – 100 Marks (50+50)

10.THEORY EXAMINATION

Paper I: Basic Sciences as applied to Endocrine Surgery (Applied Anatomy, Physiology, Biochemistry, Pharmacology and Pathology)

Paper II: Endocrine surgery – General

Paper III: Endocrine surgery – Focused to Thyroid & Thyroid related diseases

Paper IV: Recent Advances in Endocrine Surgery and Investigations for Endocrine diseases.

Each paper will contain:

1. Essay questions (2)	-	2 X 15	=	30 Marks
2. Short Notes (10)	-	10 X 7	=	70 Marks

	Total			100 Marks

11.CLINICAL EXAMINATION:

Particulars	Time for candidate to examine the cases	Time examiners question candidates for to the	Maximum Marks
Long Case	1 Case X 60 Minutes	60 Minutes	100
Short Case	2 Cases X 15 Minutes	30 Minutes	100
Ward Rounds	3 Patients X 10 Minutes	30 Minutes	100
OSCE	5 stations X 3 Minutes	15 Minutes	50
Viva Voce		15 Minutes	100
Log Book			50
Total			500

13.9 A Postgraduate student of a Postgraduate degree Course in broad specialties/ Super Specialties would be required to present one poster presentation to read one paper at a National/State conference and to present one Research paper which should be published/accepted for publication/sent for publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate Degree Examination.

Apart from Poster/Oral paper presentation in National/State conferences, the Research paper published by the candidate in the University Journal of Medical Sciences will be considered as equivalent to the Research Paper as mentioned in 13.9. clause. Case Reports can also be published in University Journal of Medical Sciences but case reports will not be considered as Research Paper.

The candidate can also present Research Paper as per Clause 13.9 of Post Graduate Education Regulation 2000, and if the article sent for publication by the candidate as primary author or corresponding author which has not yet been published/accepted for publication, the candidate should submit a letter from the HOD, stating that the article sent for publication is of publishable merit and the proof of the Research Article submitted to the Journal for publication should be sent to the university forwarded through the HOD [as per 53rd SAB]

The student can submit articles for the University journal anytime from the time of registration till 6 months prior to theory examination.

12.OSCE: 5 STATIONS:

- Pathology slide/ cytology/ HPE
- Instrument/ open/ laproscopic
- Radiology imaging- x-ray/CT scan/ MRI
- Nuclear imaging
- Interpretation of biochemical volume

13. REFERENCE BOOKS:

- 1 TEXTBOOK OF ENDOCRINE SURGERY CLARK DUH KEBEBEW 2015
- 2 THE THYROID - A FUNDAMENTAL AND CLINICAL TEXT VOL 1 "LEWIS E BRAVERMAN DAVID S.COOPER" 2013.
- 3 THE THYROID - A FUNDAMENTAL AND CLINICAL TEXT VOL 2 "LEWIS E BRAVERMAN DAVID S.COOPER" 2013
- 4 TUMOURS OF ENDOCRINE ORGANS PATHOLOGY & GENETICS WHO CLASSIFICATION OF TUMOURS 2014

- 5 "ENDOCRINOLOGY ADULT AND PEDIATRIC 6TH EDITION
THE PARATHYROID GLAND AND BONE METABOLISM" JOHN T.
POTTS Jr 2010
- 6 WILLIAMS TEXTBOOK OF ENDOCRINOLOGY 12TH EDITION
HENRY, KRONENBERG, MELMED 2012
- 7 ELEMENTS OF MEDICAL GENETICS PETER TURNPENNY 2007.
- 8 BAILEY AND LOVE'S SHORT PRACTICE OF SURGERY 24TH
EDITION RCG RUSSELL 2004.
- 9 ENDOCRINE SURGERY MADE EASY AGARWAL 2010 JAYPEE
- 10 AN ATLAS OF HEAD AND NECK SURGERY VOL 1 JOHN M.
LORE 1985.
- 11 NETTER'S ATLAS OF HUMAN EMBRYOLOGY LARRY R
COCHARD 2002
- 12 REOPERATIVE SURGERY RONALD K. TOMPKINS 1988.
- 13 APPLIED PHYSIOLOGY 13TH EDITION CYRIL A. KEELE 1988
- 14 ATLAS OF ENDOCRINE SURGICAL TECHNIQUES DUH CLARK
KEBEBEW 1996
- 15 ENDOSCOPIC AND ROBOTIC NECK SURGERY EUN CHANG
CHOI 2013
- 16 ENDOCRINE PATHOLOGY JOHN R. GOLDBLUM 2010.
- 17 SURGICAL ENDOCRINOLOGY STANLEY FRIESEN 2000.
- 18 MANUAL OF PRACTICAL ANATOMY VOL 3 HEAD NECK AND BRAIN
15TH EDITION G J ROMANES 1992.
- 19 SURGERY OF THE THYROID AND PARATHYROID GLANDS
RANDOLPH SAUNDERS 2012.
- 20 THYROID DISEASE ENDOCRINOLOGY SURGERY NUCLEAR
MEDICINE AND RADIOLOGY FALK LIPPINCOTT 2012
- 21 DIFFICULT PROBLEMS IN GENERAL SURGERY JOHN L.
SAWYERS
- 22 CLINICAL AND EXPERIMENTAL PHEOCHROMOCYTOMA WILLIAM
Manger 2012
- 23 ENDOCRINE SURGERY A COMPANION TO SPECIALIST SURGICAL
PRACTICE THOMAS W J LENNARD
- 24 TIPS AND TRICKS IN ENDOCRINE SURGERY JUH C WATKINSON
- 25 ENDOCRINE SURGERY WILLIAM B INABNET
- 26 TEXT BOOK OF ENDOCRINE SURGERY 3RD EDITION ORLO H
CLARK
- 27 BENIGN DISORDERS AND DISEASE OF THE BREAST 3RD
EDITION RE MANSEL SAUNDERS
- 28 SUPREME TRIUMPH OF SURGEONS ART A NARRATIVE HISTORY
OF ENDOCRINE SURGERY MARTHA ZEIGER
- 29 MOLECULAR BIOLOGY OF THE GENE 6TH EDITION WATSON

30. CONTEMPORARY OF MANAGEMENT OF DIABETIC FOOT BY SHARAD PENDSY
31. MANAGING THE DIABETIC FOOT WILEY BLACKWELL
32. THE DIABETIC FOOT – MEDICAL AND SURGICAL MANAGEMENT – HUMAN PRESS
33. DIABETIC FOOT – CLINICAL ATLAS – SHARAD PENDSY
34. OBESITY BARIATRIC AND METABOLIC SURGERY - SPRINGER
35. THE ASMBS TEXT BOOK OF BARIATRIC SURGERY – SPRINGER
36. MINIMALLY INVASIVE BARIATRIC AND METABOLIC SURGERY SPRINGER
37. METOBOLISM AND PATHOPHYSIOLOGY OF BARIATRIC SURGERY – ELSEVIDR
38. BUCHWALDS ATLAS OF METABOLIC AND BARIATRIC SURGICAL TECHNIQS AND PROCEDURES

****Note:** The editions are as applicable and the latest editions shall be the part of the syllabi.

14. JOURNALS:

1. WORLD JOURNAL OF ENDOCRINE SURGERY
2. JOURNAL OF INDIAN ASSOCIATION OF ENDOCRINE SURGERY
3. WORLD JOURNAL OF SURGERY
4. INDIAN JOURNAL OF SURGERY
5. BRITISH JOURNAL OF SURGERY
6. THYROID
7. THYROID RESEARCH AND PRACTICE
8. SURGERY
9. ANNALS OF SURGERY
10. JOURNAL OF CLINICAL ENDOCRINOLOGY AND METABOLISM
11. DIABETIC FOOT AND ANKLE JOURNAL
12. JOUNAL OF DIABETIC FOOT COMPLICATION

M.Ch - SURGICAL GASTROENTEROLOGY

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI

Syllabus – M.Ch. - SURGICAL GASTROENTEROLOGY

1.AIMS AND OBJECTIVES:

Surgical Gastroenterology – This would involve:

a. Diseases of gastrointestinal tract and allied organs with special reference to surgical disorders:

- Gastrointestinal and allied organ trauma.
- Gastrointestinal and allied organ oncology.
- Clinical epidemiology relevant to Gastrointestinal practice.
- Organ transplantation with relevant Immunology and Legal Issues.
- Stoma and Entero Cutaneous Fistula Management.
- Nutrition – enteral and parenteral.
- Adequate Knowledge about Pain and Palliative Care for patients with incurable and terminally ill

Relevant medical Gastroenterology knowledge.

Relevant radiology including interventional techniques, ultra sonography, nuclear medicine, CT, MRI and Angiography.

Basic sciences as applied to surgical Gastroenterology.

Diagnostic upper and lower Gastrointestinal Endoscopy including therapeutic procedures such as oesophageal varices injection, banding, dilatation and stenting of oesophageal strictures, polypectomy, etc, this should include knowledge about Endoscopic Ultra Sound Surgical skills relevant to surgical Gastroenterological practice including minimally invasive surgery.

Intensive care, ventilatory care, monitoring of sick patients and knowledge about advanced life support.

Maintenance of records and Database.

Information retrieval, use of computers in medicine, Internet..

Surgical audit.

Relevant knowledge on Bio-ethics.

Clinical, applied and basic research including elements of biostatistics.

2.THEORY SYLLABUS :

Each resident is expected to acquire a thorough theoretical knowledge of the organs of the

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

a. Oesophagus

Anatomical detail, physiology of swallowing, esophageal manometry, pilmonitoring, endoscopic ultrasound and other diagnostic techniques, brush cytology, vital staining, contrast imaging and CT scan, congenital lesions (TOF), Zenker's diverticulum, epiphrenic diverticulum, esophageal trauma, rupture-spontaneous or iatrogenic, corrosive burns-detection, evaluation and management, esophageal motility disorders, Gastro esophageal reflux disease, achalasia. Barrett's oesophagus, oesophageal cancer- adeno & squamous, various esophageal operations-diverticulectomy, excision of leiomyoma, oesophagostomy, myotomy, fundoplication, oesophageal resection (IVOR Lewis, Mc Keown, Transhiatal). cervical exploration, oesophagogastrostomy, gastric pull-up, gastric and colonic bypass, complications of oesophagectomy, management of chylothorax.

b. Stomach and Duodenum

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

c. Biliary System

Detailed anatomy, bile physiology, enterohepatic circulation, acute cholecystitis, chronic cholecystitis, acalculous cholecystitis, gallstones-pathogenesis and presentation, CBD stones. CBD stricture, cholangitis, sphincter of Oddi (SOD) dysfunction and biliary dyskinesia, cholecystopathies, postcholecystectomy syndromes, choledochal cyst, polyps of GB, carcinoma of gall bladder, cholangiocarcinoma, parasitic infestations of biliary tree, cholecystectomy-open and laparoscopic, CBD exploration and drainage, biliary bypass radical

cholecystectomy, choleduochal cyst excision, primary sclerosing cholangitis endoscopic biliary interventions and stenting, hemobilia.

d. Liver

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

e. Pancreas

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

f. Peritoneum, Omentum, Retroperitoneum

Recesses, reflections, subdiaphragmatic spaces, peritonitis primary, secondary and tertiary tuberculosis, mesenteric cyst, pseudomyxoma peritonei, ascites (diagnosis, investigation and management), retroperitoneal tumours, inguinal hernia, ventral hernias, peritoneoscopy.

g. Spleen

Anatomy, splenic function, haemolytic anaemias, splenomegaly hypersplenism, splenic trauma, cysts and granulomas, physiological effects of splenectomy, OPSI, splenic vein thrombosis, splenic artery aneurysms, splenectomy, splenic preservation.

h. Small Intestine

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

i. Colon, Rectum and Anal Canal

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

j. General Topics

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

Bioethics:

1. Respect human life and the dignity of every individual.
2. Refrain from supporting or committing crimes against humanity and condemn all such acts.
3. Treat the sick and injured with competence and compassion and without prejudice and apply the knowledge and skills when needed.
4. Protect the privacy and confidentiality of those for whom we care and breach that confidence only when keeping it would seriously threaten their health and safety or that of

others.

5. Work freely with colleagues to discover, develop, and promote advances in medicine and public health that ameliorate suffering and contribute to human well being.

6. Educate the public about present and future threats to the health of humanity.

7. Advocate for social, economic, educational and political changes that ameliorate suffering and contribute to human well being.

8. Teach and mentor those who follow us, for they are the future of our caring profession.

3. CLINICAL TRAINING :

The Students will be clinically trained in parent department during the 3 years course. The clinical work of a resident involves patient workup and evaluation both indoor and outdoor, day to day patient care both pre and post-operative including intensive care whenever necessary. Once a week combined rounds are held in collaboration with the Department of Gastroenterology with the aim of clinical and teaching discussions. Besides this, the candidate is also required to undergo a rotation in the Department of Gastroenterology (2 weeks) to learn about endoscopic procedures and with Department of Radiology (2 weeks) to learn about abdominal ultrasounds and other GI radiological investigations.

First year

- Outpatient / inpatient care.
- Endoscopy.
- Familiarization with use of computers in medicine and Learning Research Methodologies
- Assisting Elective and Emergency surgeries.
- Gastrointestinal Endoscopy – 4 weeks.
- Anaesthesia / intensive care – Learning Advanced life support System and skills in management of Ventilators – 4 weeks.
- Starting research project.
- Medical Gastroenterology and Hepatology – 4 weeks

Second year

- Outpatient / inpatient care.
- Peripheral rotations – 2 weeks each
- Radiology: RT / Oncology – optional.

- Pathology, Nuclear Medicine and vascular surgery.
- Independent operative procedure of average technical difficulty.
- Minimally invasive surgery – assisting and supervised work.

During II year students are encouraged to undergo special postings for learning new advanced techniques / Procedure / Skills in institutions of higher repute where the requisite facilities are available without affecting the duties of the parent department.

Third year

- Outpatient / inpatient care.

- Assisting and performing complex surgical procedures.
- Finalization and submission of research projects.
- Achieving competence in minimally invasive surgery and Endoscopic procedures.

SURGICAL TRAINING

1 The candidate is required to maintain a log book which details his surgical experience during his tenure in the department as an assistant, surgeon and supervisor.

2 The log book is to be updated on a daily basis and the Head of Department counter checks and endorses it every 6 months to notice any shortcomings in the residents surgical training.

The procedures that the candidate is expected to assist and perform depends upon the stage of his training tenure and is detailed in table I.

Liver Transplant Programme

Each resident is expected to be conversant with the Departmental protocols (viz.recipient selection and workup, pre-transplant evaluation, Indian brain death law, brain dead donor management - before and during retrieval, donor harvesting procedure, recipient management - operative and post transplant care and follow up).

Residents have been divided into 4 teams each separately responsible for donor retrieval, recipient procedure, bench procedure and operation theatre equipment management (for eg.running the venovenous bypass, cell saver and organising thromboelastography monitoring along with frequent blood gas and biochemical assays which may be required during the recipient operation).

Applied basic science knowledge relevant to the field of surgical Gastroenterology.

Diseases of the Gastrointestinal tract and allied organs such as liver, spleen, hepatobiliary

tract, Pancreas, etc., with special reference to those of surgical importance.

Trauma to the Gastrointestinal tract and allied organs.

Recent advances applicable to the field of Gastroenterology.

Investigation of the Gastrointestinal tract – procedures, applications, interpretations.

Bio-statistics as applicable to clinical research. Principles of clinical epidemiology.

4. SKILL TRAINING:

Decision-making, clinical diagnosis, planning, interpretation and executing investigative procedures, management of Gastrointestinal and allied organ problems.

Diagnostic and therapeutic Endoscopy (only listed procedures).

Ability to perform simple and complex operative procedures on the Gastrointestinal tract and associated organs including minimally invasive surgery.

Monitoring of the sick patients.

Counseling patients and relatives regarding Gastrointestinal problems including Transplantation.

Ability to carry out research, scientifically review research and present research findings to an audience.

Ability to teach undergraduates and postgraduates in the field of surgical Gastroenterology.

Surgical Procedures, each Candidate is Expected to Assist and Perform under supervision

Esophagus	Large Intestine	Billary surgery
Heller's Operation	Rt hemicolectomy	cholecystectomy
Fundoplication	Lt hemicolectomy	Radical
Oesophagetomy	APR	cholecystectomy
Oesophagogastrectomy	Anterior Resection	CBD Exploration/CDD
Colonic pull up	Restorative Proctocolectomy	Hepatico-jejunostomy
Stomach and Duodenum	Ileal J Pouch and anastomosis	Roux-en-y
	Prolapse rectum	Segment III HJ
TV + G.J./Poloroplasty		Portal Hypertension
Billroth I & II gastrectomy	Pancreas	Splenectomy+Devassc
Radical gastrectomy		ularisation
		Proximal Lienorenal
		shunt
		Portocaval/Mesocaval
Small Intestine	Pancreatic Necrosectomy	shunt
	Cyto-gastrostomy/jejunostomy	Liver Surgery

Resection and anastomosis	Lateral Pancreatico-jejunostomy	Major hepatic resection
Ileostomy closure	Whipple's procedure	Wedge resections
Feeding jejunostomy		Liver Transplantation

5. TEACHING METHODOLOGY:

Ward / OPD patient management.

Peri operative Management

Assisting / performing operative procedures.

Long and short topic presentations.

Ward rounds, case presentations and discussions. Combined ward rounds with Medical Gastroenterologist.

Clinicoradiological and clinicopathological conferences.

Inter-departmental Periodical meeting on relevant topics with Department of Anatomy, Physiology, Bio-chemistry and Microbiology.

Journal club.

Research review.

Problem solving sessions (Brain Storming)

Weekly Tumour Board discussions with Radiation and Medical Oncologist & Pathologist.

Guest and in-house lectures. Conferences, seminars and CME's.

Participation in workshops, etc.

Teaching undergraduates / postgraduates / paramedical staff.

Weekly Surgical audit (patient care review meeting).

Biomedical equipments use and maintenance.

6. RESEARCH WORK:

The candidate will be trained in the ability to

- Frame a research question.
- Plan a study to answer the question.
- Collect the relevant information and
- Evaluate appropriately the collected data to draw a conclusion.

The candidate should become conversant with the reporting of these results as a research paper, in journals and as a presentation in conferences.

Students should compulsorily attend Research Methodology workshop conducted by the University within first six months of M.Ch Course.

7. LOG BOOK:

The Postgraduate student of a Postgraduate Degree Course in Super specialties shall

maintain Log Book of the work carried out by them and the training programme undergone during the period of training including details of surgical operations assisted or done independently.

The Log Book shall be checked and assessed by the faculty members imparting the training.

Periodical evaluation of Log Book to be done by the Head of the Department as per 52nd SAB.

The Evaluation of the candidates in both theory and practical aspects will help the candidate in the improvement of his/her knowledge skills & attitude.

8. COMPETENCY ASSESSMENT:

Overall:

1. Communication / Commitment / Contribution / Compassion towards patients and Innovation	-	10 Marks
2. Implementation of Newly learnt techniques	-	10 Marks
3. Documentation of case sheets / discharge Summary / Review	-	10 Marks
4. Number of cases presented in Clinical Meetings/ Journal Clubs / Seminars / Papers presented in Conference.	-	10 Marks
5. No. Of Medals/ Certificates won in the conference / Quiz competitions and other academic meetings with details.	-	10 Marks
Total		50 Marks

Assessment	I	- February	-	First Year
	II	- August	-	First Year
	III	- February	-	Second Year
	IV	- August	-	Second Year
	V	- February	-	Third Year
	VI	- May	-	Third Year

VIVA INCLUDING COMPETENCY ASSESSMENT – 100 Marks (50+50)

9. THEORY EXAMINATION:

Paper – I	Basic Sciences as applied to Gastro-enterology (Applied Anatomy, Applied Physiology, Microbiology and Clinical Pharmacology).
Paper – II	Surgical Gastro-enterology – General
Paper–III	Surgical Gastro-enterology related to Hepato Biliary & Pancreatic diseases
Paper – IV	Recent Advances in Surgical Gastro-enterology and Proctology

Each paper will contain:

1. Essay questions (2) - 2 X 15 = 30 Marks
2. Short Notes (10) - 10 X 7 = 70 Marks

Total 100 Marks

10. CLINICAL EXAMINATION :

Particulars	Time for candidate to examine the cases	Time for examiners to question the candidates	Maximum Marks
Long Case	1 Case x 60 Minutes	60 Minutes	100
Short Case	2 Cases x 15 Minutes	30 Minutes	100
Ward Rounds	3 Patients x 10 Minutes	30 Minutes	100
OSCE	5 Stations x 3 Minutes	15 Minutes	50
Viva Voce		15 Minutes	100
Log Book			50
			500

As per Medical Council of India Post Graduate Medical Education Regulations 2000 (amended upto 10th August 2016) clause **13.9 A Postgraduate student of a Postgraduate degree Course in broad specialties/ Super Specialties would be required to present one poster presentation to read one paper at a National/State conference and to present one Research paper which should be published/accepted for publication/sent for publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate Degree Examination.**

Apart from Poster/Oral paper presentation in National/State conferences, the Research paper published by the candidate in the University Journal of Medical Sciences will be considered as equivalent to the Research Paper as mentioned in 13.9. clause. Case Reports can also be published in University Journal of Medical Sciences but case reports will not be considered as Research Paper.

The candidate can also present Research Paper as per Clause 13.9 of Post Graduate Education Regulation 2000, and if the article sent for publication by the candidate as primary author or corresponding author which has not yet been published/accepted for publication, the candidate should submit a letter from the HOD, stating that the article sent for publication is of publishable merit and the proof of the Research Article submitted to the Journal for publication should be sent to the university forwarded through the HOD [as per 53rd SAB]

The student can submit articles for the University journal anytime from the time of registration

in the University till 6 months prior to theory examination.

11. OSCE: (5 Stations)

1. Operative Surgery - Photograph
2. Clinical Photograph
3. Endoscopic Photograph
4. Pathology specimen
5. Counselling of a patient for a major surgical intervention

12. REFERENCE BOOKS:

1. Shackelford's Surgery of the Alimentary Tract
ISBN13-978-1437722062
2. Blumgart's Surgery of the Liver, Biliary Tract and Pancreas
ISBN-13: 978-1437714548
3. Fischer's Mastery of Surgery
ISBN-13: 978-1608317400
4. Corman's Colon and Rectal Surgery
ISBN-13: 978-1451111149
5. Surgery of the Anus, Rectum and Colon by Keighley
ISBN-13: 978-0702027239
6. Maingot's Abdominal Operations
ISBN-13: 978-0071633888
7. Art of Laparoscopic Surgery Textbook and Atlas by Palanivelu
ISBN-13: 978-8180619953
8. GI Surgery Annuals
9. Transplantation of the Liver by Busuttil
ISBN-13: 978-1455702688
10. Kirk's General Surgical Operations
11. Sabiston Textbook of Surgery : The Biological Basis of Modern Surgical Practice
12. Current Surgical Therapy by John L Cameroon
13. Video Atlas: Liver, Biliary & Pancreatic Surgery By (author) Leslie H. Blumgart
14. Essential Surgical Practice by Alfred Cuschieri
15. Schwartz's Principles Of Surgery
16. Surgical Clinics of North America

17. Greenfield's Surgery: Scientific Principles and Practice

****Note:** The editions are as applicable and the latest editions shall be the part of the syllabi.

13. JOURNALS:

1. Annals of Surgery
2. British Journal of Surgery
3. JAMA Surgery
4. Journal of the American College of Surgeons
5. Annals of Surgical Oncology
6. Liver Transplantation
7. Surgical Endoscopy
8. Journal of Gastrointestinal Surgery
9. Journal of Hepato-Biliary-Pancreatic Sciences
10. World Journal of Surgery
11. Langenbeck's Archives of Surgery
12. Digestive Surgery
13. International Journal of Surgery
14. Minimally Invasive Surgery
15. Journal of the Society of Laparoendoscopic Surgeons
16. Asian Journal of Surgery
17. Journal of Minimal Access Surgery
18. Annals of the Royal College of Surgeons of England
19. Tropical Gastroenterology
20. HPB Journal.

M.Ch - HAND SURGERY

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI
Syllabus - M.Ch. Hand Surgery

1. AIMS & OBJECTIVES

The syllabus for M.Ch., (Hand Surgery) Course should comprehensively cover all the subjects in Hand surgery during 3 years of study period. The student who undergoes the course should have an exposure to all the facets of hand surgery and develop adequate knowledge and skill to treat the patients competently after acquiring the degree.

2. THEORY SYLLABUS

General:-

1. Basic anatomy and surgical anatomy of the hand
2. Evolution of the hand
3. Embryology and Genetics of the hand development
4. Detailed anatomy of blood vessels, tendons, nerves and joints of the hand.
5. Nail bed anatomy
6. Biomechanics of hand movement and principles of kinesiology
7. Physiology of tendon nutrition and healing
8. Skeletal surgical anatomy , healing and fixation principles
9. Physiology of nerve healing
10. Brachial plexus anatomy and variations and neck anatomy
11. Tourniquet usage in the hand

Anesthesia for hand surgery:-

12. Pharmacology of local anesthetic drugs
13. Regional blocks for upper limb surgery

Burns:-

14. Thermal burns of the hand
15. Electrical burns of hand and their healing process
16. Chemical burns of hand and their healing process
17. Surgical reconstruction in hand Burns and its sequelae.
18. Pathophysiology of burns.
19. Burn wound infections and sepsis.

Infections:-

- 20. Acute infections in hand
- 21. Palmar space infections
- 22. Deformities of hand in Hansen's disease
- 23. Tendon transfers in Hansen's disease
- 24. Tuberculosis in the hand
- 25. Chronic Tenosynovitis

Degenerative disorders:-

- 26. Dupuytren's disease.
- 27. Rheumatoid arthritis of hand.

Trauma:-

- 28. General principles of hand surgery
- 29. Examination of hand.
- 30. Treatment of acute hand injuries.
- 31. Finger tip injuries.
- 32. Flexor tendon injuries.
- 33. Extensor tendon injuries.
- 34. Principles of reconstruction in mutilating hand injuries.
- 35. Soft tissue injuries/loss in hand
- 36. Mangled hand
- 37. Fractures of hand – lower end radius, carpals, metacarpals, phalanges.
- 38. Dislocations in the hand joints
- 39. Nail injuries, grafting.
- 40. Thumb reconstruction.
- 41. Peripheral nerve injuries, electro diagnostic tests.
- 42. Brachial plexus injuries – Evaluation and management
- 43. Principles and treatment of old and neglected hand deformities.
- 44. Tendon transfers for radial, ulnar and median nerve injury.
- 45. Local and distant flap covers for soft tissue defects of the hand
- 46. Problems of small joints.
- 47. Acute Compartment syndrome

Tumours:-

- 48. Benign and malignant tumours of hand.
- 49. Management of tumours in the hand

Congenital disorders:-

- 50. Congenital deformities of hand, finger, thumb
- 51. Classification of congenital disorders

Miscellaneous topics:-

- 52. Boutonniere and swan neck deformities
- 53. Vascular malformations of upper extremity.
- 54. Lymphedema in upper extremity.
- 55. Ischaemic conditions of upper extremity.
- 56. Vasospastic conditions of upper extremity.
- 57. Nerve compression syndromes.
- 58. Surgery for spastic and tetraplegic hand
- 59. Hand manifestations of clinical and metabolic diseases
- 60. Neural problems and hand eg. Parkinsonism/stroke
- 61. Diabetes mellitus manifestations in the hand
- 62. Volkmann's Ischaemic contracture – Evaluation and management
- 63. Hand transplantation biology
- 64. Transplant Immunology

Rehabilitation and physiotherapy:-

- 65. Physiotherapy regimens for rehabilitation
- 66. Outcome assessment of hand problems
- 67. Basics of prosthetics and orthotics
- 68. Uses of splints in the hand
- 69. Occupational therapy for hand rehabilitation
- 70. Stiff hand management

Wrist :-

- 71. Elbow / wrist/ DRUJ surgery
- 72. Carpal instability and its management

Microsurgery :-

- 73. Principles of microvascular surgery and its applications in hand surgery.
- 74. Principles of microneural surgery and its applications in hand surgery.
- 75. Replantation and revascularization surgery.
- 76. Reconstructive microneural surgery in the hand

77. Microvascular tissue transfers.
78. Composite Tissue Allotransplantation.

Bioethics

1. Respect human life and the dignity of every individual
2. Refrain from supporting or committing crimes against humanity and condemn all such acts
3. Treat the sick and injured with competence and compassion and without prejudice and apply the knowledge and skills when needed.
4. Protect the privacy and confidentiality of those for whom we care and breach that confidence only when keeping it would seriously threaten their health and safety or that of others
5. Work freely with colleagues to discover, develop, and promote advances in medicine and public health that ameliorate suffering and contribute to human well being
6. Educate the public about present and future threats to the health of humanity
7. Advocate for social, economic, educational and political changes that ameliorate suffering and contribute to human well being.
8. Teach and mentor those who follow us, for they are the future of our caring profession.

3.CLINICAL TRAINING

The students will be clinically trained in parent department during the 3 years course.

The candidate should have had practical training and posting in various departments as part of the training as follows

- | | |
|---|---------|
| 1. Orthopedic departments -exposure to skeletal fixation | 1 month |
| 2. Plastic surgery departments – skin and soft tissue | 1 month |
| 3. Physiotherapy department - hand | 15 days |
| 4. Splint making \Occupational therapy | 15 days |
| 6. Neurology Dept and Electromyographic studies- | 7 days |
| 7.. Micro vascular lab training courses
(40hours lab training mandatory) - Certified lab. | 7 days |
| 8. A.O Technique fixations (to attend at least one course) | 7 days |
| 9. Rheumatology | 7 days |

Total	----- 4 months -----
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During II year, students are encouraged to undergo special postings for learning new advanced techniques / Procedure / Skills in institutions of

higher reputation where the requisite facilities are available without affecting the duties of the parent department.

4. SKILL TRAINING:

The student must have acquired certain surgical skills in a structured manner during the three year period. These skills will be achieved by either assisting at the surgery or performing the surgery under the supervision of the teacher.

I year

Should have assisted at the following surgeries	Should have performed the following surgeries under guidance
Repair of flexor tendons Zone II Excision of Benign tumours like ganglion Repair digital nerve Post burn sequelae reconstruction Surgery for congenital syndactyly Minor replants Revascularisation procedure Carpal bones fracture fixation	Nail injuries Skin grafting Fracture management of hand bones Repair of flexor tendons all zones except zone II Repair of extensor tendons Local flaps Cross finger flaps

II year

Should have assisted at the following surgeries	Should have performed the following surgeries under guidance
Free tissue transfer for coverage Excision of malignant tumours Repair median, ulnar, radial nerves Tendon transfers for nerve injuries Entrapment neuropathies DRUJ problems management Surgery for cleft hand Major replants Surgery for Rheumatoid, de Quervain's, Dupuytren's Lower end radius management	Repair of flexor tendons Zone II Excision of Benign tumours like ganglion Repair digital nerve Post burn sequelae reconstruction Surgery for congenital syndactyly Minor replants Revascularisation procedure Carpal bones fracture fixation

III year

Should have assisted at the following surgeries	Should have performed the following surgeries under guidance
Brachial plexus injuries Radial club hand Pollicisation Macrodactyly reduction Surgery for AV malformations Surgery for muscle transfer for VIC Free functioning muscle transfer Vascularised toe transfer	Free tissue transfer for coverage Repair median, ulnar, radial nerves Tendon transfers for nerve injuries Entrapment neuropathies DRUJ problems management Surgery for cleft hand Major replants Surgery for Rheumatoid, de Quervain's , Dupuytren's Lower end radius management

In addition, the students should be able to

- suggest modalities of the physiotherapy needed for hand rehabilitation
- do electromyographic study in case necessary technical is not available.
- do a basic doppler study of the vessels of hand
- help in occupational rehabilitation of the hand
 - manage an intensive care facility for polytrauma including a hand injury

5. TEACHING METHODOLOGY

1. Planning session with entire Faculty and students – once in a week
2. OP clinics – 2 days/week
3. Ward rounds - 2 days/week
4. Wound care clinics - 2 days/week
5. Per-operative teaching sessions - 2 days/week
6. Classroom lectures - once in a week
7. Video teaching session - once in a week
8. Journal reading - once in a week
9. Symposium - once in a month
10. Guest lecture - once in 6 months

6. RESEARCH WORK

The candidate is introduced to the field of research in Hand surgery; both at clinical and laboratory level.

The candidate will be trained in the ability to

- Frame a research question.
- Plan a study to answer the question.
- Collect the relevant information and
- Evaluate appropriately the collected data to draw a conclusion.

The candidate should become conversant with the reporting of these results as a research paper, in journals and as a presentation in conferences.

The activities would consist of:

Planning and organizing relevant studies to be submitted as a Research paper at the end of the course.

Students should compulsorily attend Research Methodology workshop conducted by the University within first six months of M.Ch Course.

7. LOG BOOK:

The Postgraduate student of a Postgraduate Degree Course in Super specialties shall maintain Log Book of the work carried out by them and the training programme undergone during the period of training including details of surgical operations assisted or done independently.

The Log Book shall be checked and assessed by the faculty members imparting the training.

Periodical evaluation of Log Book to be done by the Head of the Department as per 52nd SAB.

The Evaluation of the candidates in both theory and practical aspects will help the candidate in the improvement of his/her knowledge skills & attitude.

8. COMPETENCY ASSESSMENT:

Overall:

- | | | |
|---|---|----------|
| 1. Communication / Commitment / Contribution / Compassion towards patients and Innovation | - | 10 Marks |
| 2. Implementation of Newly learnt techniques | - | 10 Marks |
| 3. Documentation of case sheets / discharge Summary / Review | - | 10 Marks |

4. Number of cases presented in Clinical Meetings/
Journal Clubs / Seminars / Papers presented in
Conference. - 10 Marks
5. No. Of Medals/ Certificates won in the conference
/ Quiz competitions and other academic meetings
with details. - 10 Marks

Total 50 Marks

Assessment I	- February	-	First Year
II	- August	-	First Year
III	- February	-	Second Year
IV	- August	-	Second Year
V	- February	-	Third Year
VI	- May	-	Third Year

VIVA INCLUDING COMPETENCY ASSESSMENT – 100 Marks (50+50)

9. THEORY EXAMINATION

Paper I Basic sciences
 Paper II Basic Hand Surgery
 Paper III Applied Hand Surgery
 Paper IV Recent advances

Each paper will contain:

1. Essay questions (2) - 2 X 15 = 30 Marks
2. Short Notes (10) - 10 X 7 = 70 Marks

Total 100 Marks

10.PRACTICAL SCHEME:

Particulars	Time for candidate to examine the cases	Time for examiners to question the candidates	Maximum Marks
Long Case	1 Case x 60 Minutes	60 Minutes	100

Short Case	2 Cases x 15 Minutes	30 Minutes	100
Ward Rounds	3 Patients x 10 Minutes	30 Minutes	100
OSCE	5 Stations x 3 Minutes	15 Minutes	50
Viva Voce		15 Minutes	100
Log Book			50
			500

As per Medical Council of India Post Graduate Medical Education Regulations 2000 (amended upto 10th August 2016) clause **13.9 A Postgraduate student of a Postgraduate degree Course in broad specialties/ Super Specialties** would be required to present one poster presentation to read one paper at a National/State conference and to present one Research paper which should be published/accepted for publication/sent for publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate Degree Examination.

Apart from Poster/Oral paper presentation in National/State conferences, the Research paper published by the candidate in the University Journal of Medical Sciences will be considered as equivalent to the Research Paper as mentioned in 13.9. clause. Case Reports can also be published in University Journal of Medical Sciences but case reports will not be considered as Research Paper.

The candidate can also present Research Paper as per Clause 13.9 of Post Graduate Education Regulation 2000, and if the article sent for publication by the candidate as primary author or corresponding author which has not yet been published/accepted for publication, the candidate should submit a letter from the HOD, stating that the article sent for publication is of publishable merit and the proof of the Research Article submitted to the Journal for publication should be sent to the university forwarded through the HOD[as per 53rd SAB] The student can submit articles for the University journal anytime from the time of registration till 6 months prior to theory examination.

11.OSCE: 5 stations

1. Clinical photograph of clinical scenario
2. Clinical photograph of clinical scenario
3. Clinical photograph or video of Operative surgery
4. Photograph of Recent Advances in Plastic Surgery or Equipment used in Plastic surgery
5. Photograph of Rehabilitation aids

12.REFERENCE BOOKS

Examination of the Hand – Lister

Mc Gregor: Fundamental Techniques of Plastic Surgery

Plastic Surgery by Peter C. Neligan

Green's Operative Hand Surgery

Campbell Orthopaedic surgery

Surgery of the wrist

The Growing Hand by Amit Gupta

Structural and dynamic basis of hand surgery – Zancolli

****Note:** The editions are as applicable and the latest editions shall be the part of the syllabi.

13.JOURNALS

1. JHS: Journal of Hand Surgery American and European volumes
2. Clinics in Hand Surgery
3. Journal of Reconstructive Microsurgery

M.Ch - GYNAECOLOGICAL ONCOLOGY

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI.
Syllabus - M.Ch. Gynaecological Oncology

1.AIMS & OBJECTIVES

The syllabus for M.Ch., (Gynaecological Oncology) Course should comprehensively cover all the subjects in gynaecological oncology surgery during 3 years of study period. This course aims to produce competent specialists who recognize the health needs of India and carry out their professional obligations in an ethical and competent manner. The student who undergoes the course should have an exposure to all the facets of gynaecological oncology including radiation therapy and chemotherapy.

2.THEORY SYLLABUS

I. General Principles:-

- a. History of Gynaecologic Oncology Surgery and its broad scope at the present time.
- b. Anatomy and Physiology of the female reproductive system.
- c. Care of wounds, dressing, and general surgical techniques
- d. Wound healing.
- e. Hospital infections.
- f. Suture materials.
- g. Surgical instruments.
- h. Principles of chemotherapy
- i. Principles of radiation therapy
- j. Principles of genetics and general approach to the management of hereditary gynaecological cancers.
- k. Flaps: Fasciocutaneous, muscle, musculocutaneous flaps used in radical procedures such as exenteration or radical vulvectomy
- l. Local anaesthesia, regional anaesthesia, general anaesthesia.
- m. Endoscopy including laparoscopy and robotic surgery.
- n. Hormonal therapy
- o. Principles of immunotherapy
- p. Essentials of Molecular Biology: carcinogenesis, cell cycle, apoptosis, angiogenesis, genomics
- q. Cancer diagnosis: tumour markers, ultrasound, CT scan, PET scan, FNAC, histopathology

II. Epidemiology : Occurrence and distribution of gynaecologic cancers, aetiological associations, protective factors, risk factors, time trends, research methods

Skills to be attained:

- a. Critical review of the literature

- b Design of a research project
- c Grant / IRB application
- d Data management, descriptive statistics, measures of association & effect and, survival analysis
- e Interpretation and presentation of results

III.Surgical anatomy: Pelvic and abdominal anatomy, applied anatomy

Skills to be attained:

- a cadaver dissection
- b animal dissection

IV. Genetics: Chromosomal and gene mutations associated with neoplasia, chromosomal abnormalities and oncogenes and, familial cancers

Skills to be attained:

- a Describe carcinogenesis
- b Describe the genetic changes associated with genital tract neoplasms
- c Explain the familial aspects of gynaecological cancers and offer genetic counselling to patients

V. Preventive oncology: Screening for preinvasive disease and gynaecologic cancers especially cancer cervix, down staging, HPV vaccines, lifestyle changes, treatment of endometrial hyperplasia, risk reducing surgery

Skills to be attained:

- a Discuss and plan screening programmes
- b Interpret results of Pap smears and HPV DNA testing
- c Colposcopy and directed biopsies
- d Pipelle biopsies
- e Transvaginal ultrasound scanning
- f Use of hormones

VI. Diagnostic techniques: Comprehensive gynaecological history and examination, establishing the diagnosis and extent of disease, evaluation of co-existing disease, evaluate response to treatment, clinical / surgical staging

Skills to be attained:

- a Comprehensive medical history taking and clinical examination including per vaginal and per rectal examinations
- b Select diagnostic tests to establish a diagnosis
- c Evaluate co-morbidities and performance status

- d Establish extent of disease and stage it by the current FIGO classification
- e Perform, VIA, Pap smear, Vulval, vaginal, cervical and endometrial biopsies
- f Perform, colposcopy, sigmoidoproctoscopy, hysteroscopy, laparoscopy, paracentesis, percutaneous/endoscopic/open biopsies
- g Read plain x-rays, ultrasound scans, PET/CT scans, MRI images
- h Explain and interpret assays of tumour markers such as CA125, beta hCG, AFP, CEA, inhibin and monoclonal antibodies
- i Describe and interpret liver function, renal function pulmonary function, cardiovascular function tests and blood coagulation tests.

VII. Pathology: Genesis of malignant tumours, biological behaviour of premalignant and invasive tumours, gross and microscopic features, clinicopathological correlation, prognostic factors

Skills to be attained:

- a Should be able to identify by gross and microscopic examination benign and malignant neoplasms of the vulva, vagina, cervix, uterus, tubes, ovaries, peritoneum and trophoblast
- b Describe the natural history, routes of spread and prognosis of gynaecological cancers
- c Describe immunohistochemistry and molecular markers of gynaecological cancers

VIII. Pathophysiology: Fluid, electrolyte and acid-base status in health and disease relative to gynaecologic malignancies. Physiology and pathophysiology of pulmonary, renal, endocrine and GI systems such that the candidate is able to manage critically ill patients with multiorgan involvement.

Skills to be attained:

- a Describe the physiology and pathophysiology of pre-operative and post-operative patients
- b State the normal laboratory parameters of the various organ systems and correct deficits or excess
- c Describe the changes associated with intestinal resection, intestinal obstruction, radiation, chemotherapy and the cancer itself

IX. Microbiology: Bacterial, fungal and viral infections in relation to gynaecologic malignancies; their diagnosis and management.

Skills to be attained:

- a Interpret gram stain results
- b Order specific tests for various infective processes
- c Proper specimen collection for culture as well as molecular tests

X. Tumour immunology: The immune system and its responses, host-tumour interactions, tumour markers, applied immunology such as host resistance, effects of radiation and chemotherapy on immune responses, immunosuppression in relation to carcinogenesis and immunological enhancement.

Skills to be attained:

- a Describe the basis of humoral and cellular immunity
- b Explain the effects of nutrition, drugs and radiation on the immune response
- c Explain the principles of immunological enhancement and tolerance

XI. Pharmacology: Principles of drug absorption, distribution, metabolism, excretion, mechanisms of action and effect modifiers. Pharmacology of drugs used for common medical conditions such as diabetes, hypertension, epilepsy, depression and thyroid disorders. Pharmacokinetics of anaesthetic agents, antimicrobials, antiemetics, analgesics, haematinics and anticoagulants. Pharmacology of total parenteral nutrition and wound healing.

Skills to be attained:

- a Describe the pharmacokinetics and pharmacodynamics of commonly used drugs
- b Prescribe TPN, antimicrobial agents, analgesics, antiemetics, sedatives and anticoagulants.
- c Recognise adverse effects of commonly used drugs

XII. Chemotherapy: Kinetics of cancer cell growth, cell cycle, Drugs used in tumour chemotherapy, treatment of specific tumours, principles of combination chemotherapy, neoadjuvant and adjuvant therapy, side-effects and toxicity, drug trials and supportive therapy.

Skills to be attained:

- a Identify appropriate chemotherapeutic regimens for gynecological cancers, dose dense regimens, intraperitoneal chemotherapy
- b Calculate doses of chemotherapeutic agents
- c Prescribe premedications to alleviate side effects
- d Prescribe supportive measures and manage complications of chemotherapy
- e Describe salvage therapies and targeted therapies

XIII. Therapeutic principles: Pretreatment evaluation, preoperative preparation, choice of treatment modality, postoperative management and adjuvant therapy for neoplastic conditions of the vulva, vagina, cervix, uterus, fallopian tubes, ovaries and trophoblast. Management of intraoperative and postoperative complications such as shock, thrombosis, sepsis, coagulopathy, transfusion reactions, injury to adjacent structures, respiratory and cardiac problems.

Skills to be attained:

- a Counsel patient about treatment options
- b Evaluate for co-morbidities, presence of metastases
- c Correct fluid and electrolyte imbalances
- d Treat pre-invasive disease
- e Treat invasive disease with primary surgery or chemotherapy
- f Advise on adjuvant treatments
- g Manage intraoperative and postoperative complications

XIV. Surgical procedures: The candidate should know the rationale, indications, complications and operative steps of cone biopsy, cryotherapy, LLETZ, hysterectomy, radical hysterectomy, trachelectomy, debulking of ovarian malignancy with peritoneal stripping and total omentectomy, pelvic and para-aortic lymphadenectomy, vaginectomy, vulvectomy, inguinofemoral lymphadenectomy, pelvic exenteration, intestinal resection, ileostomy, colostomy, urinary diversion and continence surgery, ureteric anastomosis, vulvovaginal reconstruction, control of intraoperative haemorrhage and placement of long lines and chest drains. Endoscopy in gynaecological cancers; fertility sparing surgery for gynaecological cancers.

Surgical procedures that candidate should be able to perform independently:

- a Cone biopsy, LLETZ
- b Hysterectomy: abdominal, vaginal, laparoscopic and radical
- c Debulking of ovarian cancer
- d Pelvic lymphadenectomy
- e Para-aortic lymphadenectomy
- f Vaginectomy
- g Radical vulvectomy / wide local excision
- h Inguinofemoral lymphadenectomy
- i Pelvic exenteration
- j Ileostomy
- k Colostomy
- l Bladder repair, Partial and total cystectomy
- m Diaphragm stripping
- n Omental pedicle graft

Surgical procedures that candidate should have assisted in

- a Splenectomy
- b Diaphragm resection and repair
- c Ileal / colonic urinary conduit
- d Bowel resection and anastomosis
- e Ureteroneocystostomy
- f Vulval and vaginal reconstruction

XV. Radiation therapy: Radiation effects on cell metabolism and growth, radiation sensitivity, radiation physics, radiation planning, recovery from radiation effects, radiosensitisers, chemoradiation, teletherapy, brachytherapy, interstitial therapy, radiation protection and clinical radiotherapy.

Skills to be attained:

- a Should be able to discuss the place of radiation therapy and treatment planning in malignancies of the cervix, vagina, vulva, uterus.
- b Should be able to place vaginal moulds and intrauterine tandems

XVI. Pain relief and palliation: Pain ladder, narcotic and non-narcotic analgesia, neural blocks, sedatives and anxiolytics, relief of nausea and vomiting, gastrointestinal alimentation, community support and hospice care.

- a Should be able to offer pain relief due to surgery or progressive cancer
- b Should be able to offer supportive care for anxiety, nausea/vomiting
- c Should be able to coordinate care with community health workers, hospice and religious leaders for end of life care

XVII. Psychosexual care: Body image, self-esteem, depression, psychosexual rehabilitation, quality of life issues, care of the 'survivor'

Skills to be attained:

- a Manage quality of life issues
- b Offer psychosocial support

XVIII. Community oncology: Preventive oncology: cancer screening, early detection, HPV vaccines, determinants of health seeking behaviour, financial implications, compliance, operations research, health policy.

Skills to be attained:

- a. Home visit
- b. Health education
- c. Screening

XIX. Research: Research methodology - both basic science and clinical. The project should have a clear hypothesis, comprehensive literature review, study design, reproducible and valid methodology, results with tabular and graphic presentation of findings, appropriate statistical analysis, valid conclusions and summary.

Skills to be attained:

- a At least one abstract at a scientific meeting in the specialty

- b At least one publication in a scientific journal

XX. Ethics: Informed consent, Principles of medical ethics, risk management and medicolegal aspects of practice.

XXI. Teaching and training: The candidate would be expected to teach nursing students, allied health students, undergraduates and postgraduates doing Diploma or Masters degree. Administrative experience to allow development of skills for the provision and organization of clinical services.

Bioethics

1. Respect human life and the dignity of every individual
2. Uphold ethical principles of beneficence, autonomy, justice and non-maleficence
3. Treat the sick and injured with competence, compassion and without prejudice.
4. Protect the privacy and confidentiality of those for whom we care and breach that confidence only when the life of the patient or that of others are at stake.
5. Work freely with colleagues to discover, develop, and promote advances in medicine and public health that ameliorate suffering and contribute to human well being
6. Educate the public about present and future threats to the health of humanity
7. Advocate for social, economic, educational and political changes that ameliorate suffering and contribute to human well being.
8. Teach and mentor those who follow us, for they are the future of our caring profession.

3. CLINICAL TRAINING

The students will be clinically trained in parent department during the 3 years course.

Clinical rotations will consist of the following:

I year: 2 weeks Anatomy & Pathology
 2 weeks ICU
 2 weeks Palliative care

II year: 4 weeks Medical Oncology
 4 weeks Radiation Oncology
 2 weeks Elective

ie., Postings for 2 weeks at other MCI Recognised centres for M.Ch. (Gynaec Oncology) to learn advanced techniques if need be.

III year: 4 weeks Colorectal surgery
 2 weeks Urology

Curriculum consists of the following modules:

- 1) General assessment of a cancer patient:
 - History taking
 - Clinical examination
 - Investigations
 - Interpretation and communication of results
 - Ordering of further / special investigations
 - Communicating clinical plan to patient and relatives
 - Liaising with other specialties
- 2) Perioperative Care:
 - Plan appropriate surgery, Discussion at MDT meetings
 - Identify anaesthetic & surgical risks
 - Informed consent, Discuss risks & benefits
 - Prepare patient for surgery
 - Manage complications
 - Fluid & electrolytes, Nutrition & TPN
 - Prophylaxis for VTE, Infection, GI ulcer
 - Audits of morbidity & Mortality
- 3) General Surgical skills:
 - Anatomical knowledge
 - Surgical techniques
 - Personal audit
 - Diagnosis & Management of Cancers of the vulva, vagina, cervix, endometrium, myometrium, ovary, tubes, peritoneum and trophoblast
- 4) Cancer of the vulva:
 - Anatomy of vulva, femoral triangle, vagina & lower abdomen
 - Epidemiology & aetiology of vulval cancers
 - Histopathology of vulval cancer
 - Patterns of spread
 - Staging of vulval cancer
 - Investigations, Diagnosis & Treatment of vulval cancer
 - Sentinel node biopsy
 - Flaps for wound closure
 - Management of complications such as wound breakdown, lymphocysts, lymphedema and neuralgia
 - Management of psychosexual issues
 - Management of cancer recurrence

- 5) Cancer of the vagina:
 - Anatomy of the vagina
 - Carcinoma, Sarcoma and metastatic lesions
 - Differentiate malignant from benign lesions
 - VAIN and its management
 - Staging of vaginal cancer
 - Partial & Radical vaginectomy
 - Psychosexual morbidity
 - Radiation therapy for vaginal cancers
- 6) Cancer of the cervix:
 - Detailed anatomy of the pelvis
 - Epidemiology & aetiology of cervical cancer
 - CIN & its management
 - Role of HPV
 - Diagnosis of cervical cancer
 - Pathology of cervical cancer
 - Staging of cervical cancer
 - Management of all stages: Surgery, Radiation, Chemotherapy
 - Role of laparoscopy
 - Short and Long term complications of treatment
 - Fertility sparing treatments
 - Patterns of recurrence & management
 - Psychosexual issues
 - Prevention of cervical cancer: primary & secondary
- 7) Cancers of the Uterus:
 - Aetiology
 - Histological types
 - Pre-operative assessment
 - Staging of endometrial cancer, sarcomas
 - Sentinel node biopsy
 - Surgery for uterine cancers: need for lymphadenectomy, laparoscopy
 - Adjuvant therapy: Radiation, Chemotherapy & Hormones
 - Management of recurrence
- 8) Gestational Trophoblastic Neoplasia
 - Aetiology
 - Histopathology, Classification
 - Investigations, clinical use of serum hCG
 - Prognostic scoring
 - Management of low risk GTN

- Management of high risk GTN
- Role of surgery and radiation
- Follow up of patients after molar pregnancy & GTN
- 9) Ovarian cancer:
 - Aetiology; Risk & protective factors
 - Histopathology: epithelial, germ cell & stromal tumours
 - Pre-operative evaluation: Imaging, Tumour markers
 - Treatment of ovarian cancers
 - Adjuvant & neoadjuvant chemotherapy for ovarian cancers
 - Role of laparoscopy in assessment & management
 - Primary & Interval debulking
 - Fertility sparing surgery
 - Management of complications: Bowel obstruction, anastamotic leak
 - Intravenous & Intraperitoneal chemotherapy; HIPEC
 - Management of recurrence: Secondary debulking, Second line chemotherapy
- 10) Medical Oncology:
 - Cell biology: cell kinetics, log kill hypothesis, Cycle & phase specificity
 - Classes of chemotherapeutic agents, mechanism of action
 - Pharmacology of drugs used in gynaecological cancers
 - Dose calculation and scheduling
 - Risks & Benefits of single agent and combination chemotherapy
 - Evaluation of response
 - Clinical trials
 - Targetted agents
 - Dose dense regimens
 - Metronomic chemotherapy
 - Consolidation and maintenance chemotherapy
- 11) Radiation Oncology:
 - Radiation effects
 - Recovery and Repair of tissues
 - Selection and Planning for radiotherapy
 - Types of radiation therapy
 - Sensitivity of different tissues
 - Potentiation, Sensitization, Modifying factors
 - Radiation units, isodose curves, Fractionation
 - CT planning & Dosimetry
 - Types of sources, fields, orthovoltage & supravoltage
 - Chemoradiation
 - Complications of radiation therapy

- 12) Radiology:
- Principles of imaging modalities
 - Role of imaging in gynaecologic cancers
 - Role of interventional radiology: guided biopsy, stents, caval filters, embolisation
 - Ultrasound, CT scan, MRI scan, PET scan
- 13) Palliative care:
- Care of terminally ill patients
 - How to break bad news
 - Causes & patterns of pain
 - Pain management
 - Pathophysiology of nausea & vomiting
 - Treatment of nausea & vomiting
 - Management of anxiety & depression
 - Counselling for patient and family
 - Pathophysiology of edema
 - Treatment of edema & lymphedema
 - Knowledge of the community
 - Roles of nurses, general practitioners, cancer support groups, family
 - Spiritual care
- 14) Urology:
- Anatomy & physiology of kidney, ureter, bladder & urethra
 - Effects of gynaecologic cancers on the urinary tract
 - Urinary obstructions & fistulae
 - Effects of surgery & radiation on the urinary tract
 - Management of injuries to the urinary tract
 - Ileal conduits
- 15) Colorectal surgery:
- Anatomy & physiology of GI tract
 - Pathophysiology of intestinal function
 - Principles of bowel handling, resection & repair
 - Ileostomy & colostomy
 - Use of radiology in GI disorders
 - Pre-operative bowel preparation
 - Techniques of resection and anastomosis
 - Abdominoperineal resection
 - Perform appendicectomy, repair of bowel injury, bowel resection
 - Post-operative management after GI surgery

- 16) Plastic Surgery:
- Physiology of wound healing
 - Surgical site infections
 - Wound dehiscence, Burst abdomen
 - Management of incisional hernia, mesh repair
 - Rotational flaps, advancement flaps, myocutaneous flaps
- 17) Genetics in Gynaecological oncology:
- Diagnose & investigate a patient with a genetic predisposition to gynaecological cancers
 - Understanding familial cancer syndromes: BRCA & Lynch
 - Screening patients at high risk
 - Prophylactic surgery
 - Understanding the complexities of counselling and subsequent management
- 18) Generic:
- Communication, team work, leadership skills
 - Concerns, priorities & expectations of patients
 - Bereavement process
 - Roles & responsibilities of team members, improving team work
 - Qualities & behaviours of leaders
 - Doctor–patient relationship
 - Legal issues: death certification, mental illness, living wills, advance directives
 - Learning principles, needs & styles
 - Principles of evaluation
 - Research designs
 - Data management & Statistical analysis
 - Guidelines, Evidence based practice
 - Risk management, Reporting of near-misses, litigation & claims management

During II year, students are encouraged to undergo special postings for learning new advanced techniques / Procedure / Skills in institutions of higher repute where the requisite facilities are available without affecting the duties of the parent department.

4. SKILL TRAINING

The student must have acquired certain surgical skills in a structured manner during the three year period of his course. These skills will be achieved by either assisting at the surgery or performing the surgery under the supervision of the teacher.

I year

Should have assisted at the following surgeries	Should have performed the following surgeries
Radical Vulvectomy Radical Hysterectomy Staging laparotomy for endometrial & ovarian cancer Pelvic & Para-aortic lymphadenectomy Sentinel lymph node biopsy	Vulval, Vaginal, Cervical & Endometrial biopsy Colposcopy, LLETZ, Conisation Salpingo-oophorectomy Hysterectomy Laparoscopy

II year

Should have assisted at the following surgeries	Should have performed the following surgeries
Inguinofemoral lymphadenectomy Pelvic & Para-aortic lymphadenectomy Primary debulking for ovarian cancer	Radical vulvectomy Radical hysterectomy Staging laparotomy for endometrial cancer Laparoscopic salpingo-oophorectomy Interval debulking for ovarian cancer

III year

Should have assisted at the following surgeries	Should have performed the following surgeries
Diaphragm stripping & resection Splenectomy Ureteroneocystostomy, Boari flap Anterior exenteration, Ileal conduit Posterior exenteration Vulvar & Vaginal reconstruction	Pelvic & Paraaortic lymphadenectomy Inguinofemoral lymphadenectomy Ileostomy Colostomy Bowel resection & anastomosis Laparoscopic hysterectomy

5. TEACHING METHODOLOGY

1. Planning session with entire Faculty and students – once in a week
2. OP clinics – 2 days/week
3. Ward rounds - 2 days/week
4. Cancer screening clinic - once/week
5. Per-operative teaching sessions - 2 days/week

6. Video teaching session - once in a week
7. Journal reading - once in a week
8. Symposium - once in a week
9. Guest lecture - once in 3 months

6. RESEARCH WORK

The candidate is introduced to the field of research in gynaecologic oncology both, at clinical and laboratory level.

The candidate will be trained in the ability to

- Frame a research question.
- Plan a study to answer the question.
- Collect the relevant information and evaluate appropriately the collected data to draw a conclusion.

The candidate should become conversant with the reporting of these results as a research paper, in journals and as a presentation in conferences.

The activities would consist of:

Planning and organizing relevant studies to be submitted as a Research paper at the end of the course.

Students should compulsorily attend Research Methodology workshop conducted by the University within first six months of M.Ch Course.

7. LOG BOOK:

The Postgraduate student of a Postgraduate Degree Course in Super specialties shall maintain Log Book of the work carried out by them and the training programme undergone during the period of training including details of surgical operations assisted or done independently.

The Log Book shall be checked and assessed by the faculty members imparting the training.

Periodical evaluation of Log Book to be done by the Head of the Department as per 52nd SAB.

The Evaluation of the candidates in both theory and practical aspects will help the candidate in the improvement of his/her knowledge skills & attitude.

8.COMPETENCY ASSESSMENT:

Overall:

1. Communication / Commitment / Contribution /
Compassion towards patients and Innovation

-

10 Marks

2. Implementation of Newly learnt techniques	-	10 Marks
3. Documentation of case sheets / discharge Summary / Review	-	10 Marks
4. Number of cases presented in Clinical Meetings/ Journal Clubs / Seminars / Papers presented in Conference.	-	10 Marks
5. No. Of Medals/ Certificates won in the conference / Quiz competitions and other academic meetings with details.	-	10 Marks

	Total	50 Marks

Assessment	I	- February	-	First Year
	II	- August	-	First Year
	III	- February	-	Second Year
	IV	- August	-	Second Year
	V	- February	-	Third Year
	VI	- May	-	Third Year

VIVA INCLUDING COMPETENCY ASSESSMENT – 100 Marks (50+50)

9.THEORY EXAMINATION

Paper I - Basic Sciences & Recent Advances in Gynaecologic Oncology
 Paper II - Radiation and Medical Oncology in gynaecologic cancers
 Paper III - Preventive oncology and Epidemiology
 Paper IV - Clinical Gynaecologic Oncology & Operative surgery

Each paper will contain:

1. Essay questions (2)	-	2 X 15 =	30 Marks
2. Short Notes (10)	-	10 X 7 =	70 Marks

	Total		100 Marks

10. CLINICAL EXAMINATION:

Particulars[as per 53rd SAB]	Time for candidate to examine the cases	Time for examiners to question the candidates	Maximum Marks
Long Case	1 Case x 60 Minutes	60 Minutes	100
Short Case	2 Cases x 15 Minutes	30 Minutes	100
Ward Rounds	3 Patients x 10 Minutes	30 Minutes	100
OSCE	5 Stations x 3 Minutes	15 Minutes	50
Viva Voce		15 Minutes	100
Log Book			50
			500

As per Medical Council of India Post Graduate Medical Education Regulations 2000 (amended upto 10th August 2016) clause **13.9. A Postgraduate student of a Postgraduate degree Course in broad specialties / Super Specialties would be required to present one poster presentation, to read one paper at a National / State conference and, to present one research paper which should be published / accepted for publication / sent for publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate Degree Examination.**

Apart from Poster/Oral paper presentation in National/State conferences, the Research paper published by the candidate in the University Journal of Medical Sciences will be considered as equivalent to the Research Paper as mentioned in 13.9. clause. Case Reports can also be published in University Journal of Medical Sciences but case reports will not be considered as Research Paper.

The candidate can also present Research Paper as per Clause 13.9 of Post Graduate Education Regulation 2000, and if the article sent for publication by the candidate as primary author or corresponding author which has not yet been published/accepted for publication, the candidate should submit a letter from the HOD, stating that the article sent for publication is of publishable merit and the proof of the Research Article submitted to the Journal for publication should be sent to the university forwarded through the HOD [as per 53rd SAB]

The student can submit articles for the University journal anytime from the time of registration till 6 months prior to theory examination.

11.OSCE: 5 stations

1. Pathology specimen
2. Surgical Instrument
3. Radiological image (CT or MRI)
4. Interpretation of lab values
5. Clinical scenario

12.REFERENCE BOOKS

1. Berek and Hacker's Gynecologic Oncology, Berek & Hacker, LWW, 6th Ed, 2014
2. Clinical Gynecologic Oncology, DiSaia, Creaseman, Mannel, McMeekin & Mutch, Elsevier, 9th Ed, 2017
3. Principles and Practice of Gynecologic Oncology, Chi, Berchuck, Dizon & Yashar, LWW, 7th Ed. 2017
4. Atlas of Gynecologic Oncology, Smith, Del Priore, Coleman & Monaghan, Informa Healthcare, 3rd Ed, 2011
5. Atlas of Pelvic Anatomy and Gynecologic Surgery, Baggish & Karram, Elsevier, 4th ed, 2015.

****Note:** The editions are as applicable and the latest editions shall be the part of the syllabi.

13. JOURNALS

1. Indian Journal Gynaecologic Oncology
2. Indian Journal Surgical Oncology
3. Journal of Gynecologic Surgery
4. International Journal Gynecologic Cancer
5. Gynecologic Oncology
6. Journal of Gynecologic Oncology
7. Indian Journal of Cancer

M.Ch - HEPATO PANCREATO BILIARY SURGERY

THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI
Syllabus – M.Ch. HEPATO PANCREATO BILIARY SURGERY

I.AIMS:

The syllabus for MCh - Hepato Pancreato Biliary Surgery course should comprehensively cover all aspects of HPB Surgery during the 3 year study period.

II. OBJECTIVES:

At the end of the study period the trainee should

- Develop expertise in the understanding, diagnosis, and management of surgical aspects of diseases of the liver, biliary tract and pancreas
- Acquire the necessary operative skills
- Be prepared to begin a career in HPB Surgery

III. THEORY SYLLABUS:

The curriculum consists of nine major modules, some with subunits. This has been developed based on the modules suggested by the International Hepato Pancreato Biliary Association.

Unit 1 – History of HPB Surgery

- History of evolution of HPB Surgery and transplantation
- Immunosuppression
- Scope for the future

Unit 2 – Imaging

1. Objectives
2. Content
 - a. Imaging of HPB
 - b. The clinical protocols available for each technology
 - c. Imaging algorithm for the investigation of hepatobiliary and pancreatic lesions
 - d. Intra-operative ultrasound
3. Clinical skills

Unit 3 – The liver

- A. Anatomy, physiology, investigations
 - 1. Objectives
 - 2. Content
 - a. Extra-hepatic anatomy of the liver
 - b. Anatomy of the porto-hepatis
 - c. Anatomy of caudate lobe
 - d. Anatomy of the retro-hepatic space
 - e. Intra-hepatic anatomy
 - f. Physiology of the liver
 - g. Hematologic, biochemical, and histologic testing (assessment) of the liver
 - 3. Clinical skills
- B. Congenital and acquired non-neoplastic liver disease
 - 1. Objectives
 - 2. Content
 - a. Basics of Pediatric liver disease
 - 1. Biliary atresia
 - 2. Caroli's disease
 - 3. Congenital hepatic fibrosis
 - b. Liver cysts and abscesses
 - 1. Solitary liver cysts
 - 2. Polycystic liver disease
 - 3. Pyogenic and fungal liver abscess
 - 4. Other liver abscess including amoebic abscess, tuberculosis
 - 5. Echinococcal liver cyst
 - c. Portal haemodynamics and portal hypertension
 - 1. Pathophysiology
 - 2. Portal pressure – implication
 - 3. Complications of portal hypertension
 - 4. Interpretation of hematologic and biochemical tests and imaging
 - 5. Management of portal pressures
 - 6. Management of acute variceal bleed
 - 3. Clinical skills
- C. Neoplastic liver disease
 - 1. Objectives
 - 2. Content
 - a. Benign neoplasms of the liver

- b. Primary malignancies of the liver
 - 1. Hepatoblastoma
 - 2. Hepatocellular carcinoms (HCC)
 - 3. Cholangiocarcinoma (intra-hepatic or peripheral)
 - 4. Vascular tumor of liver
 - 5. Other neoplasm
 - c. Secondary malignancies of the Liver
 - 1. Colorectal primary
 - 2. Neuroendocrine and other primary
 - 3. Clinical Skills
- D. Surgery of Liver
- 1. Objectives
 - 2. Content
 - a. Types of liver resection
 - b. Preoperative assessment and the cumulative risks to the proposed procedure
 - c. Preoperative management
 - d. Liver resection
 - e. Intraoperative management during a liver resection
 - f. Postoperative management
 - 3. Clinical Skills

Unit 4 – The biliary tract including gallbladder

- A. Anatomy, embryology, physiology, investigations
 - 1. Objectives
 - 2. Content
 - a. Embryology of the biliary tract
 - b. Anatomy of the hepatic duct and biliary plate
 - c. Anatomy of the gallbladder and cystic duct
 - d. Anatomy of the bile duct
 - e. Bile metabolism and biliary physiology
 - f. Biochemical investigation
 - g. Imaging
 - 3. Clinical Skills
- B. Congenital and Non-neoplastic biliary disease
 - 1. Objectives
 - 2. Content
 - a. Congenital and paediatric
 - b. Gallstones

- c. Benign biliary strictures
- d. Intra-hepatic stones
- e. Cholangitis
- 3. Clinical Skills
- C. Neoplastic biliary disease
 - 1. Objectives
 - 2. Content
 - a. Gall bladder
 - 1. Polyps
 - 2. Adenocarcinoma
 - b. Bile duct
 - 3. Clinical Skills

Unit 5 – The pancreas and duodenum

- A. Anatomy, Embryology, Physiology, Investigations
 - 1. Objectives
 - 2. Content
 - a. Embryology of the pancreas and duodenum
 - b. Anatomy of the pancreas
 - c. Anatomy of the pancreatic duct – variants of normal and anomalies
 - d. Anatomy of the duodenum
 - e. Pancreas physiology – endocrine and exocrine
 - f. Duodenal physiology
 - g. Biochemical Testing
 - h. Imaging
 - i. Application of testing and imaging to pancreatic and duodenal surgery
 - 3. Clinical Skills
- B. Congenital and acquired non-neoplastic pancreatic disease
 - 1. Objectives
 - 2. Content
 - a. Pancreatitis
 - 1. Acute
 - 2. Chronic
 - b. Pancreas Divisum
 - c. Annular pancreas

3. Clinical Skills

C. Neoplastic Diseases of the Pancreas

1. Objectives

2. Content

- a. Benign cysts and neoplasms of the pancreas
 - 1. Microcystic serous cystadenoma
 - 2. Mucinous cystic neoplasm
 - 3. Intraductal papillary mucinous neoplasm (IPMN)
 - 4. Solid Pseudopapillary Neoplasms
 - 5. Cystic Neuroendocrine Tumors
 - 6. Von Hippel Lindau syndrome
- b. Malignancies of the pancreas
 - 1. Primary
 - a. Adenocarcinoma
 - b. Locally advanced pancreatic carcinoma
 - c. Neuroendocrine tumors
 - 2. Secondary

3. Clinical Skills

D. Diseases of the Duodenum

1. Objectives

2. Content

- a. Congenital disorders of the duodenum
- b. Benign neoplasms
- c. Malignant neoplasms of the duodenum

3. Clinical Skills

Unit 6 – Oncology

1. Objectives

2. Content

- a. Basic pathophysiology of neoplasia
- b. Chemotherapy
- c. Multidisciplinary management
- d. Combined modality treatment
- e. Immunotherapy

3. Clinical Skills

Unit 7 – Trauma

1. Objectives
2. Content
 - a. Liver trauma
 - b. Biliary tract and portal structures
 - c. Pancreatic and duodenal trauma
3. Clinical Skills

Unit 8 – Transplantation

1. Objectives
2. Content
 - a. Organ procurement
 - b. Living donor assessment
 - c. Living donor left or right hepatectomy
 - d. Organ preservation – principles and application
 - e. Transplantation
1. End stage liver disease
 - a. Hepatitis and acute liver disease
 - b. Chronic liver disease cirrhosis and portal hypertension
2. Indications for liver transplantation
3. Techniques of liver transplant
4. Techniques of Pancreas transplant
5. Immunosuppression
6. Complications of transplantation
3. Clinical Skills

Unit 9 – Bio-ethics

1. Objectives
2. Content
3. Clinical Skills

Bioethics

- Respect human life and the dignity of every individual
- Refrain from supporting or committing crimes against humanity and condemn all such acts
- Treat the sick and injured with competence and compassion and without prejudice and apply the knowledge and skills when needed.
- Protect the privacy and confidentiality of those for whom we care and breach that confidence only when keeping it would seriously threaten their health and safety or that of others

- Work freely with colleagues to discover, develop, and promote advances in medicine and public health that ameliorate suffering and contribute to human well being
- Educate the public about present and future threats to the health of humanity
- Advocate for social, economic, educational and political changes that ameliorate suffering and contribute to human well being.
- Teach and mentor those who follow us, for they are the future of our caring profession.

IV CLINICAL TRAINING

SKILL TRAINING

TEACHING METHODOLOGY

RESEARCH WORK

LOG BOOK

V ASSESSMENT

1. PERIODIC APPRAISAL
2. FINAL APPRAISAL
 - a. Theory
 - b. Practical
 - c. OSCE
 - d. Additional University requirements

VI REFERENCE MATERIAL

1. Books
2. Journals

Unit 1 – History of HPB Surgery

Objectives:

History of evolution of

- a. HPB Surgery
- b. Transplantation
- c. Immunosuppression

Scope for the future

Unit 2 – Imaging

1. **Objectives:** Upon completion of this unit the trainee will:

- a. Understand the physics and technology of ultrasound and doppler, CT scan, MRI scan, PET scan, digital subtraction angiography (DSA) and other nuclear medicine imaging procedures including biliary excretion scan (HIDA), Octreotide scan and other radio labeled somatostatin analogues
- b. Understand the relative advantages, disadvantages and indications of each
- c. Read and interpret the detailed information provided by the imaging of the liver, biliary tract, pancreas and duodenum
- d. Perform and interpret intra-operative ultrasound

2. **Content:**

- a. (1) The applied physics and technology of ultrasound and doppler scan, CT scan, MRI scan, PET scan, DSA and other nuclear medicine imaging procedures
- (2) Liver Radiology - anatomy of cross sectional imaging CT (Tri-phasic) and MRI.
- (3) Principles of MRI and various contrast agents

b.The clinical protocols available for each technology

- (1) The information provided by each protocol
- (2) The interpretation of images
- (3) The application to clinical investigation

c. Imaging algorithm for the investigation of hepatobiliary and pancreatic lesions including

- (1) Liver cyst or tumor
- (2) Obstructive jaundice
- (3) Periapillary tumor
- (4) Cyst or mass in the pancreas

d. Intra-operative ultrasound

- (1) Detecting a lesion

- (2) Understanding the spectral doppler waveform of the hepatic vessels

3. Clinical Skills:

- a. Apply understanding of the relative merits of each imaging modality to efficiently investigate (including staging of) lesions of the liver, biliary tract, and pancreas
- b. Interpret images to correctly identify normal structures, anomalies and pathologic abnormalities
- c. Correlate and integrate the findings of the various imaging studies during the investigation of a patient
- d. Perform and interpret intra-operative ultrasound
- e. Interact with diagnostic and interventional Radiologists with expertise in HPB diseases and body imaging

Unit 3 – The Liver

A. Anatomy, Physiology, Investigations

1. **Objectives:** Upon completion of this unit the trainee will understand:

- a. Extra-hepatic anatomy of the liver and the relationship with adjacent structures
- b. Detailed intra hepatic anatomy
- c. Liver function tests and its interpretation
- d. Hepatic imaging techniques and their indications and interpretation
- e. Implications of investigations and surgical procedures on the liver

2. Content

a. Extra-hepatic anatomy of the liver

- (1) Hepatic veins and variants of normal
- (2) Portal triad structures and segmental anatomy

- (3) Ligaments, fissures

- (4) Anomalies

b. Anatomy of the porta-hepatis

- (1) Portal vein, hepatic artery
- (2) Bile duct, gall bladder
- (3) Variants of normal and anomalies

- (4) Lymphatic drainage and nodal anatomy
- (5) Nerves

c. Anatomy of caudate lobe

d. Anatomy of the retro-hepatic space

- (1) IVC and its tributaries
- (2) Adrenal, kidney, diaphragm

e. Intra-hepatic anatomy:

- (1) Sections, segments
- (2) Nomenclature systems
- (3) Histology of the normal liver

f. Physiology of the liver

- (1) Bilirubin metabolism
- (2) Coagulation
- (3) Other clinically relevant metabolic pathway

g. Hematologic, biochemical, and histologic testing (assessment) of the liver

- (1) Transaminases
- (2) Markers of cholestasis
- (3) Measures of liver function
 - (a) Static – including INR (PT), Factors V and VII, bilirubin, albumin
 - (b) Dynamic – including clearance tests, e.g. ICG
- (4) Indicators of portal hypertension
- (5) Indications for liver biopsy

3. Clinical Skills:

- a. Identify, recognize, and describe anatomic structures in and around the liver
 - (1) By reading and interpreting images of the liver
 - (2) Intra-operatively
- b. Perform and interpret intra-operative ultrasound of the liver
- c. Perform liver biopsy – laparoscopic or open
- d. Identify anatomic anomalies and explain their embryologic origin
- e. Understand the indications and be able to interpret the hematologic and biochemical tests and explain the underlying physiology

- f. Interpret the dynamic tests of liver function
- g. Apply the relative advantages and disadvantages to the application of the different modalities of hepatic imaging
- h. Determine the appropriate abdominal wall incisions for open procedures on the liver
- i. Determine the appropriate port site placements and patient positions for laparoscopic procedures on the liver
- j. Evaluate portal hypertension
- k. Assess severity of liver failure
- l. Risk of concurrent non liver operation in the presence of cirrhosis
- m. Risk assessment of liver resection in the presence of cirrhosis
- n. Develop a detailed operative strategy for liver resections based on preoperative assessment and imaging

B. Congenital and acquired non-neoplastic liver disease

1. **Objectives:** Upon completion of this unit the trainee will understand:

- a. The pathophysiology, presentation and natural history of the congenital and acquired non-neoplastic diseases of the liver
- b. The investigative procedures available to efficiently diagnose the disease/disorder
- c. The treatment options available for the condition and the results, including the risks and benefits of operative and non-operative procedures
- d. The pre, intra- and postoperative management, including the management of complications of therapy

2. **Content:**

a. Basics of Pediatric liver disease

- (1) Biliary atresia
 - (a) Presentation, evaluation and natural history
 - (b) Treatment options and indications for intervention
- (2) Caroli's disease
- (3) Congenital hepatic fibrosis

b. Liver cysts and abscesses

- (1) Solitary liver cysts
 - (a) Presentation, evaluation and natural history
 - (b) Distinguish from cystic neoplasm

- (c) Treatment options and indications for intervention
- (2) Polycystic liver disease
 - (a) Associated abnormalities
 - (b) Presentation, evaluation and natural history
 - (c) Treatment options and indications for intervention
- (3) Pyogenic and fungal liver abscess
 - (a) Potential bacterial and fungal pathogens and sources
 - (b) Presentation, evaluation
 - (c) Treatment and indications for surgical drainage
- (4) Other liver abscess including amoebic abscess, tuberculosis
 - (a) Presentation, evaluation and natural history
 - (b) Treatment options and indications for intervention
- (5) Echinococcal liver cyst
 - (a) Life cycle, epidemiology, target organs
 - (b) Presentation, evaluation and natural history
 - (c) Treatment options and indications for intervention
- (c) Portal haemodynamics and portal hypertension**
 - (1) Pathophysiology
 - (2) Portal pressure – implication
 - (3) Complications of portal hypertension (including porto pulmonary hypertension, hepato pulmonary syndrome, refractory ascites and hepatic hydrothorax)
 - (4) Interpretation of hematologic and biochemical tests and imaging
 - (5) Management of portal pressures
 - (a) Non-operative treatment options and strategies
 - (b) Use of interventional radiology in the management of portal hypertension as well as biliary and vascular complications
 - (c) Porto-systemic decompression
 - (i) Indications and sequelae
 - (ii) Risks and benefits of TIPS and surgical shunts
 - (iii) Types of surgical shunts
 - (iv) Relative indications
 - (v) Devascularisation procedures
 - (6) Management of acute variceal bleed
 - (a) Endoscopic sclerotherapy
 - (b) Non operative ICU management

3. Clinical Skills:

- a. Diagnose and treat patients with cystic diseases of the liver
- b. Diagnose and manage patients with liver abscess
- c. Perform laparoscopic and open drainage of liver cyst or abscess (de-roofing, resection)
- d. Diagnose and manage patients with portal hypertension

C. Neoplastic liver disease

1. Objectives: Upon completion of this unit the trainee will understand:

- a. The pathology, presentation and natural history of benign, primary and secondary malignant neoplasms of the liver
- b. The investigative procedures available to diagnose the disease/disorder
- c. The staging of malignancies of the liver including histologic assessment
- d. The treatment options available for the neoplasm, and the results, including the risks and benefits of the operative and non-operative procedures
- e. The pre, intra- and postoperative management, including the management of complications of therapy.
- f. The role of neoadjuvant and adjuvant therapy of malignant liver neoplasms.

2. Content:

a. Benign neoplasms of the liver

- (1) Presentation, investigation, diagnosis, and natural history of haemangioma, hamartoma, adenoma, focal nodular hyperplasia
- (2) Histology and indications for biopsy
- (3) Treatment options and indication for ablation or resection

b. Primary malignancies of the liver

- (1) Hepatoblastoma
 - (a) SIOPEL stratification
 - (b) Chemotherapy for hepatoblastoma
 - (c) Management including surgery for hepatoblastoma
 - (d) Long term outcome
- (2) Hepatocellular carcinoma (HCC)
 - (a) Epidemiology, etiology, presentation, investigation, diagnosis, and natural history of HCC

- (b) Variant HCC including image findings and pathological correlation
 - (i) Fibrolamellar
 - (ii) Mixed (cholangiocarcinoma - HCC)
- (c) Role of screening, cost effectiveness and staging systems for HCC
Treatment options and the risk: benefit ratio for each - resection, transplantation, ablation, chemotherapy +/- embolization, radiation
- (d) Non surgical treatment of HCC
 - (i) Chemoembolization
 - (ii) Radioembolization
 - (iii) Adjunctive ablative techniques (radio frequency ablation / microwave / cryotherapy)
- (e) Resection for HCC
 - (i) Non cirrhotic HCC / cirrhotic HCC
 - (ii) Liver failure after resection
 - (iii) Pre operative and post operative management strategies
- (f) Transplantation for HCC – Criteria
 - (i) MILAN
 - (ii) UCSF
 - (iii) Ontario
- (g) Prevention of HCC
- (3) Cholangiocarcinoma (intra-hepatic or extra-hepatic)
 - (a) Epidemiology, diagnosis, investigation and staging
 - (b) Management
 - (i) Preoperative liver optimization
 - (ii) Biliary drainage, ERCP / PTBD
 - (iii) Curative resection technique including vascular resection
 - (iv) Transplantation
 - (v) Chemotherapy, radiation therapy
 - (vi) Palliative procedures including photodynamic therapy
- (4) Vascular tumor of liver
 - (a) Haemangioma
 - (b) Angiosarcoma
 - (c) Epithelioid hemangioendothelioma
 - (i) Diagnosis, investigation and staging
 - (ii) Treatment options
- (5) Other neoplasm

- (a) Lymphoma
- (b) Sarcoma
- (i) Diagnosis, investigation and staging
- (ii) Treatment options

c. Secondary malignancies of the liver

- (1) Colorectal primary
 - (a) Pathogenesis, staging of colorectal cancer
 - (b) Investigation and staging
 - (c) Treatment options
 - (i) Indications and risk: benefit ratio of ablation /resection
 - (ii) Neo-adjuvant, down staging, and adjuvant chemotherapy
 - (iii) Liver resection for colorectal metastatic disease – staged resection
 - (iv) ALPPS
- (2) Neuroendocrine and other primary
 - (a) Functional / non functional tumours
 - (b) Investigation and staging
 - (c) Functional status assessment
 - (d) Radiological imaging
 - (e) Nuclear medicine imaging Octreotide PET Scan
 - (f) Treatment options; Indications, and risk: benefit ratio ablation / resection / transplant
 - (g) Treatment with radio labelled somatostatin analogues including
 - DOTA-NOC PET / CT
 - (h) Neoadjuvant and adjuvant therapy, long acting octreotide, radioembolization
 - (i) Liver-directed treatment options such as thermal ablation techniques, embolization, and somatostatin analogues

3. Clinical Skills:

- a. Evaluate patients with benign neoplasms of the liver, including interpretation of imaging and indications for biopsy
- b. Manage patients with benign hepatic neoplasms
- c. Evaluate patients with HCC, including screening for potential HCC and staging
- d. Evaluate patients with primary and secondary adenocarcinoma and other metastatic lesions of the liver including staging
- e. Manage patients with primary and secondary hepatic malignancies
- f. Participate in multidisciplinary tumor review conferences
- g. Provide pre- and postoperative therapy following liver resection including the diagnosis and management of complications
- h. Recommend appropriate therapy for unresectable hepatic malignancies
- i. Recommend appropriate adjuvant radiation and/or chemotherapy following resection for hepatic malignancies
- j. Interact with Medical and Radiation Oncologists / Pathologists

D. Surgery of Liver

- 1. **Objectives:** Upon completion of the course the trainee will understand:

- a. The types of and techniques of liver resections
- b. Preoperative patient assessment and the cumulative risks of the proposed procedure
- c. Preoperative management
- d. Intraoperative management during a liver resection
- e. Postoperative management including complications.

- 2. **Content:**

a. Types of liver resection

- (1) Nomenclature of liver resections (Brisbane system)
- (2) Laparoscopic, laparoscopic-assisted, open laparotomy
- (3) Non-anatomic, segmental, extended hepatectomies
- (4) Vascular control: none, Pringle manoeuvre, total vascular isolation
- (5) Vascular resection and reconstruction
- (6) Staged resections
- (7) Combination with ablation

b. Preoperative assessment and the cumulative risks to the proposed procedure

- (1) Patient comorbidities (cardiopulmonary and other)
- (2) Risk of liver failure
 - (a) Assessment of liver function, portal hypertension
 - (b) Volumetric assessment of liver remnant
 - (c) Improving safety of resection
 - (a) Portal vein embolization

c. Preoperative management

- (1) Prophylaxis against common complications - DVT, infection
- (2) Neuroendocrine hormonal blockade
- (3) Detailed operative plan based on preoperative imaging
- (4) Nutritional assessment / physical assessment

d. Liver resection

- (1) Anaesthetic considerations - agents, coagulation, CVP
- (2) Blood loss conservation including cell saver and blood product administration
- (3) Laparoscopic techniques
 - (a) Patient and port placement
 - (b) Hand port
- (4) Parenchymal transection techniques
 - (a) Relative advantages and disadvantages
 - (b) Normal, fatty, fibrotic and cirrhotic parenchyma
 - (c) Laparoscopic or open use
- (5) Concomitant resection and reconstruction of the
 - (a) Diaphragm
 - (b) IVC
 - (c) Portal vein

e. Intraoperative management during a liver resection

- (1) Various transection techniques
- (2) Haemostasis to cut surface
 - (a) Suture
 - (b) Argon

- (c) Coagulant spray
- (d) Fibrin sealant patch

f. Postoperative management

- (1) Complications of liver resection
- (2) Management of post operative liver failure

3. Clinical Skills:

- a. Evaluate patients for liver surgery including the comorbidities and any underlying liver disease to determine risk
- b. Determine the need for portal vein embolization, staged resection or concomitant ablation
- c. Perform intraoperative staging of tumors including intraoperative ultrasound
- d. Perform parts of liver resections using a variety of approaches and transection techniques
 - (1) Mobilization of liver
 - (2) Control of the inflow and outflow system during liver resection.
 - (3) Filleting liver from IVC
 - (4) Parenchymal transection techniques
 - (5) Haemostasis
- e. Manage the liver resection patient, during the immediate, early and late post-operative periods and diagnose and treat complications of the resection

Unit 4 – The Biliary Tract including Gallbladder

A. Anatomy, Embryology, Physiology, Investigations

- 1. **Objectives:** Upon completion of this unit the trainee will understand:
 - a. The anatomy of the biliary tract including intra and extra hepatic ducts, the gallbladder and cystic duct, the common bile duct, the ampulla of Vater, and their relationships with adjacent and surrounding structures
 - b. The embryology of the biliary tract and potential anomalies
 - c. The physiology of bile flow and bile salt metabolism
 - d. Clinical biochemical tests relevant to the biliary tract and their interpretation
 - e. Biliary imaging techniques and their indications and interpretation
 - f. Implications of investigations on surgical procedures on the bile duct
 - g. Obstructive jaundice

2. Content:

a. Embryology of the biliary tract

- (1) Relationship to liver, pancreas and other portal and foregut structures

b. Anatomy of the hepatic duct and biliary plate

- (1) Segmental anatomy and variants
- (2) Blood supply and lymphatic drainage
- (3) Relationship with other portal structures

c. Anatomy of the gallbladder and cystic duct

- (1) Blood supply and lymphatic drainage
- (2) Variants of normal and anomalies

d. Anatomy of the bile duct

- (1) Blood supply, lymphatic drainage and regional lymph nodes
- (2) Variants of normal and anomalies
- (3) Relationship with other portal structures and the pancreatic duct
- (4) Sphincter of Oddi and ampulla of Vater

e. Bile metabolism and biliary physiology

- (1) Bile-salt dependent and independent bile production.
- (2) Enterohepatic circulation
- (3) Hormonal influences
- (4) Biliary epithelium and gallbladder function
- (5) Sphincter of Oddi motility

f. Biochemical investigation

- (1) Interpretation

g. Imaging

- (1) Endoscopic ultrasound
- (2) Direct contrast imaging

- (a) Percutaneous trans-hepatic cholangiogram (PTC) and endoscopic retrograde cholangiopancreatography (ERCP)
- (3) Endoscopic assessment of Ampulla of Vater
- (4) Nuclear biliary excretion imaging (HIDA scan) – qualitative and quantitative

3. Clinical Skills:

- a. Identify and describe biliary tract structures (normal and abnormal)
 - (1) By reading and interpreting images of the biliary tract
 - (2) Intra-operatively
- b. Perform and interpret intra-operative cholangiogram and Ultrasound of the biliary tract
- c. Identify anatomic anomalies and explain their embryologic origin
- d. Understand the indications for and be able to interpret biochemical tests and explain underlying physiology
- e. Apply understanding of the relative advantages and disadvantages of different modalities of biliary tract imaging to determine optimal investigation
- f. Determine abdominal wall incisions that are appropriate for open procedures on the biliary tract and relative indications for each
- g. Determine appropriate port site placements and patient positions that are useful for laparoscopic procedures on the biliary tract and the relative indications for each.
- h. Develop a detailed operative strategy for biliary surgery based on preoperative assessment and imaging

B. Congenital and Non-neoplastic biliary disease

- 1. **Objectives:** Upon completion of this unit the trainee will understand:
 - a. The pathophysiology, presentation and natural history of congenital and acquired non-neoplastic diseases of the biliary tract including the gallbladder
 - b. Investigative procedures available for the diagnosis of the disease/disorder
 - c. Treatment options available for the condition and the outcomes, including the risks and benefits of operative and non-operative treatments
 - d. The pre, intra and postoperative management, including the management of complications of therapy
- 2. **Content:**
 - a. **Congenital and paediatric**

- (1) Choledochal cyst, Caroli's disease, congenital hepatic fibrosis, biliary atresia
 - (a) Presentation, classification, evaluation and natural history
 - (b) Treatment options and indications for intervention

- (2) Cholestatic diseases - biliary diversion procedures

b. Gallstones

- (1) Pathogenesis
- (2) Presentation and investigation of biliary colic, cholecystitis, cholangitis, Mirizzi syndrome, gallstone ileus
- (3) Treatment: percutaneous, laparoscopic and open
- (4) Cholecystectomy related biliary injuries
 - (a) Mechanism of injury & classification
 - (b) Associated injuries
 - (c) Management

c. Benign biliary strictures

- (1) Extrahepatic and intrahepatic stricture
 - (a) Aetiology
 - (b) Natural history and non-operative management
 - (c) Oriental cholangitis
 - (d) Primary sclerosing cholangitis (PSC)
 - (i) Evaluation
 - (ii) Screening for cholangiocarcinoma
 - (iii) Biliary drainage
 - (iv) Resection
 - (v) Liver Transplantation
- (2) Post traumatic and idiopathic
 - (a) Mechanism of injury and classification
 - (b) Management options

d. Intra-hepatic stones

- (1) Pathophysiology, presentation and investigation
- (2) Surgical options including liver resection and biliary access choledochojejunostomy, hepaticojejunostomy with trans-hepatic stents.

e. Cholangitis

- (1) Aetiology

- (2) Imaging
- (3) Management
 - (a) Biliary drainage – Percutaneous transhepatic biliary drainage (PTBD); Endoscopic Retrograde Cholangio Pancreaticogram (ERCP)
 - (b) Definitive management

3. **Clinical Skills:**

- a. Investigate the jaundiced patient by determining the most efficient modalities, and interpret the results of biochemical testing and imaging
- b. Apply understanding of the relative merits and disadvantages of non-operative biliary manipulation (PTBD and endoscopic stenting) to treat biliary tract obstruction.
- c. Manage the patient with complex gallstone disease
- d. Manage biliary injuries resulting from cholecystectomy and other trauma
- e. Perform resection and reconstruction for choledochal cysts, intra-hepatic stones (including choledochoscopy), and repair of benign strictures
- f. Evaluate and manage the patient with complications of cholangitis.

C. **Neoplastic Biliary Disease**

- 1. **Objectives:** Upon completion of this unit the trainee will understand:
 - a. The presentation and natural history of benign and malignant neoplasms of the bile duct and gallbladder
 - b. The investigative procedures available to efficiently diagnosis cholangiocarcinoma and carcinoma gallbladder.
 - c. The staging of adenocarcinoma of the bile duct and gallbladder including histologic assessment
 - d. The treatment options available for the neoplasm and the indications and outcomes including risks and benefits of operative and non-operative treatments
 - e. The pre, intra and postoperative management, including management of complications of surgery
 - f. The role of neoadjuvant and adjuvant chemo and radiation therapy of malignant biliary neoplasms

2. **Content:**

a. **Gallbladder**

- (1) Polyps

- (a) Presentation, natural history
- (b) Indications for operation
- (c) Principles of resection
- (2) Adenocarcinoma
 - (a) Presentation, staging (including histology) and natural history
 - (b) Investigation
 - (c) Surgical options: extent and timing of resection
 - (d) Chemo and radiotherapy - Neo- and/or adjuvant therapy
 - (e) Palliative care options

b. Bile duct

- (1) Adenoma of Ampulla of Vater
 - (a) Presentation, natural history, investigation
 - (b) Resection options - Endoscopic, transduodenal resection and reconstruction
- (2) Cholangiocarcinoma
 - (a) Classification and terminology (Newer concepts)
 - (b) Natural history
 - (c) Location: Hilar (Klatskin), intrapancreatic, ampulla
 - (d) Presentation, investigation and diagnosis
 - (i) Sampling techniques
 - (e) Staging (including laparoscopic assessment)
 - (f) Resection and reconstruction – indications and contraindication
 - (g) Transplantation
 - (h) Palliative options
 - (i) PTBD or endoscopic stent
 - (ii) Surgical / endoscopic bypass

3. Clinical Skills:

- a. Investigate and manage patients with gallbladder polyps and benign neoplasms of the ampulla of Vater
- b. Investigate and manage patients with hilar cholangiocarcinoma – assist in extended liver resection including with caudate lobe resection, portal lymphadenectomy, and biliary reconstruction
- c. Investigate and manage patients with distal bile duct tumors; perform pancreatoduodenectomy

- d. Participate in multidisciplinary tumor review conferences
- e. Provide postoperative management including the diagnosis and treatment of complications of biliary resection and/or bypass
- f. Recommend appropriate therapy for unresectable carcinoma of the gall-bladder or bile duct

Unit 5 – The Pancreas & Duodenum

A. Anatomy, Embryology, Physiology, Investigations

1. **Objectives:** Upon completion of this unit the trainee will understand:
 - a. Anatomy of pancreas and its relationship with portal structures, retroperitoneal structures and adjacent organs
 - b. Anatomy of the pancreatic duct and its relationship with the bile duct, sphincter of Oddi and ampulla of Vater
 - c. Anatomy of duodenum and its relationship with portal structures, retroperitoneal structures and adjacent organs
 - d. The embryology of the pancreas, pancreatic duct, duodenum and potential anomalies
 - e. The physiology of pancreatic exocrine functions and duodenal physiology
 - f. Clinical biochemical tests of pancreatic function and injury and their interpretation
 - g. Pancreatic and duodenal imaging techniques and their indications and interpretation
 - h. Implications of investigations on surgical procedures on the pancreas and duodenum

2. Content:

a. Embryology of the pancreas and duodenum

- (1) Relationship to liver, bile duct and other foregut structures
- (2) Anomalies including pancreas divisum and types of annular pancreas

b. Anatomy of the pancreas

- (1) Spectrum of normal anatomy and variants
- (2) Arterial supply and venous drainage
- (3) Lymphatic drainage and regional lymph nodes
- (4) Relationship with:
 - (a) Portal structures: duodenum, bile duct, hepatic artery, portal vein, splenic and superior mesenteric veins and their branches

- (b) Retroperitoneum: IVC and its branches, aorta and SMA and their branches, adrenal gland, kidneys
- (c) Adjacent organs: stomach, spleen, colon, small intestine

c. Anatomy of the pancreatic duct - variants of normal and anomalies

d. Anatomy of the duodenum

- (1) Spectrum of normal anatomy and variants
- (2) Arterial supply and venous drainage
- (3) Lymphatic drainage and regional lymph nodes
- (4) Relationship with:
 - (a) Portal structures: bile duct, hepatic artery, portal vein, splenic and superior mesenteric veins and their branches
 - (b) Retroperitoneum: IVC and its branches, aorta and SMA and their branches, adrenal gland, kidneys
 - (c) Adjacent organs: pancreas, stomach, spleen, colon, small intestine

e. Pancreas physiology – exocrine and endocrine

- (1) Exocrine enzyme physiology
 - (a) Synthesis, excretion and activation
 - (b) Neural and hormonal influences
- (2) Endocrine
 - (a) Islet cell function
 - (b) Neuroendocrine hormones

f. Duodenal physiology

- (1) Motility
- (2) Neuroendocrine (“gut”) hormone physiology
- (3) Biochemical investigation and interpretation

g. Biochemical Testing

- (1) Markers of pancreatic injury
- (2) Measures of pancreatic exocrine function
- (3) Urinary and serum neuroendocrine hormones

h. Imaging

- (1) Axial and body imaging techniques:
 - (a) Ultrasound
 - (b) Triphasic CT scan and MRI scan, including MRCP
- (2) Endoscopy and endoscopic U/S

- (3) Direct contrast imaging
- (a) Endoscopic retrograde cholangio-pancreatography (ERCP)
- (4) Nuclear studies:
 - (a) PET scan
 - (b) Neuroendocrine imaging (Octreotide scan)

i. Application of testing and imaging to pancreatic and duodenal surgery

3. Clinical Skills:

- a. Identify, recognize, and describe anatomic structures in and around the pancreas & duodenum by reading and interpreting images of the duodenum, pancreas and its duct
- b. Perform and interpret intra-operative ultrasound of the pancreas and surrounding structures
- c. Identify anatomic anomalies and explain their embryologic origin
- d. Understand the indications for and interpret biochemical tests; explain the underlying physiology including tests of pancreatic function
- e. Apply the relative advantages and disadvantages of different modalities of pancreatic imaging to efficiently investigate diseases and disorders of the pancreas and duodenum
- f. Determine appropriate abdominal wall incisions for open procedures on the pancreas and/or duodenum
- g. Determine appropriate port site placements and patient positions for laparoscopic procedures on the pancreas and/or duodenum and relative indications for each and the need for a hand-port
- h. Develop a detailed operative strategy for pancreatic and duodenal surgery based on preoperative assessment and imaging.

B. Congenital and acquired non-neoplastic pancreatic disease

- 1. **Objectives:** Upon completion of this unit the trainee will understand:
 - a. The pathophysiology, presentation and natural history of congenital and acquired non-neoplastic diseases of the pancreas
 - b. Investigative procedures available to efficiently diagnose the disease/disorder
 - c. Treatment options available for the condition, and results, including the risks and benefits of operative and non-operative procedures

- d. Pre, intra and postoperative management, including the management of complications of therapy

2. Content:

a. Pancreatitis

- (1) Acute
 - (a) Pathogenesis, staging and prognosis
 - (b) Management, including surgical options and complications
 - (c) Indications for surgical intervention
- (2) Chronic
 - (a) Pathogenesis, complications and non-operative management
 - (b) Pancreatic stents and endoscopic/percutaneous drainage procedures
 - (c) Surgical options and indications
 - (d) Pain control

b. Pancreas Divisum

- (1) Pathogenesis, staging and prognosis
- (2) Management, including surgical options and complications
- (3) Indications for surgical intervention

c. Annular pancreas

- (1) Pathogenesis, types and prognosis
- (2) Management, including surgical options and complications
- (3) Indications for surgical intervention

3. Clinical Skills:

- a. Manage patients with acute pancreatitis, including complications
 - (1) Determine the need for surgical intervention
 - (2) Perform open and/or minimally invasive procedures for acute pancreatitis
- b. Investigate and manage the patient with chronic pancreatitis
 - (1) Determine the need for operative intervention
 - (2) Perform: pseudocyst-enterostomy, Frey procedure, pancreatic resection

C. Neoplastic Diseases of the Pancreas

- 1. **Objectives:** Upon completion of this unit the trainee will understand:

- a. The pathophysiology, presentation and natural history of benign, primary and secondary malignant neoplasms of the pancreas
- b. Investigative procedures available to efficiently diagnose the disease/disorder
- c. Staging of malignancies of the pancreas including histologic assessment
- d. Treatment options available for the neoplasm and outcomes, including the risks and benefits of operative and non-operative procedures
- e. Pre, intra and postoperative management, including the management of complications of therapy
- f. The role of neoadjuvant and adjuvant therapy of malignant pancreatic lesions

2. Content:

a. Benign cysts and neoplasms of the pancreas

- (1) Microcystic serous cystadenoma
 - (a) Presentation, investigation, diagnosis, and natural history
 - (b) Histology and indications for biopsy
 - (c) Treatment options and indication for resection
- (2) Mucinous cystic neoplasm
 - (a) Presentation, investigation, diagnosis, and natural history
 - (b) Histology and indications for aspiration/biopsy
 - (c) Treatment options and indication for resection
- (3) Intraductal papillary mucinous neoplasm (IPMN)
 - (a) Presentation, investigation, diagnosis, and natural history
 - (b) Histology and indications for aspiration / biopsy
 - (c) Treatment options and indication for resection
- (4) Solid Pseudopapillary Neoplasms
 - (a) Presentation, investigation, diagnosis, and natural history
 - (b) Histology and indications for aspiration / biopsy
 - (c) Treatment options and indication for resection
- (5) Cystic Neuroendocrine Tumors
 - (a) Presentation, investigation, diagnosis, and natural history
 - (b) Histology and indications for aspiration / biopsy
 - (c) Treatment options and indication for resection
- (6) Von Hippel Lindau syndrome
 - (a) Pathology, associated lesions, investigation
 - (b) Management

b. Malignancies of the pancreas

(1) Primary

(a) Adenocarcinoma

- (i) Presentation, investigation and staging
- (ii) Assessment of resectability
- (iii) Pre, peri and postoperative management
- (iv) Palliative procedures

(b) Locally advanced pancreatic carcinoma

- (i) Clinical assessment and staging
- (ii) Criteria for resectability / irresectability
- (iii) Neoadjuvant therapy, chemoradiation therapy
- (iv) Down staging and definition of response
- (v) Preparation for vascular resection
- (vi) Molecular targeted therapy and adjuvant therapy

(c) Neuroendocrine tumors (including MEN syndromes)

- (i) Presentation, investigation and staging
- (ii) Assessment of resectability
- (iii) Pre, peri and postoperative management

(2) Secondary

3. Clinical Skills:

a. Investigate and manage patients with benign cysts and neoplasms of the pancreas

- (1) Determine need for biopsy/aspiration and resection
- (2) Perform resections including enucleation of neuroendocrine tumors and spleen preserving distal pancreatectomy

b. Investigate and manage patients with adenocarcinoma of the pancreas

- (1) Stage the tumor pre and intra-operatively and determine resectability
- (2) Perform pancreatoduodenectomy
- (3) Understand principles of vascular resection in pancreatic cancer
- (4) Perform distal pancreatectomy and regional lymphadenectomy
- (5) Perform palliative procedures for unresectable tumors

c. Participate in multidisciplinary tumour review conferences

- d. Provide postoperative management including the diagnosis and treatment of complications of pancreatic resection and/or bypass
- e. Recommend appropriate therapy for unresectable pancreatic carcinoma
- f. Recommend appropriate neo and adjuvant radiation and/or chemotherapy and interact with Medical and Radiation Oncologists

D. Diseases of the Duodenum

1. **Objectives:** Upon completion of this unit the trainee will understand:

- a. Pathophysiology, presentation and natural history of the diseases of the duodenum
- b. Investigative procedures available to efficiently diagnose the disease/disorder
- c. Treatment options available for the condition and the results, including the risks and benefits of the operative and non-operative procedures
- d. Pre, intra and postoperative management, including the management of complications of therapy

2. **Content:**

a. Congenital disorders of the duodenum

- (1) Duodenal atresia and duplication
- (2) Duodenal diverticulae

b. Benign neoplasms

- (1) Adenoma
- (2) Hereditary Familial Polyposis
 - (a) Genetics, presentation, investigation
 - (b) Management

c. Malignant neoplasms of the duodenum

- (1) Adenocarcinoma
 - (a) Presentation, investigation, staging
 - (b) Management
- (2) Gastrointestinal stromal tumor (GIST) and sarcomas
 - (a) Presentation, investigation, staging
 - (b) Management options
 - (i) Chemotherapy

- (ii) Resection
- (3) Neuroendocrine tumor
- (a) Presentation (syndromes) investigation, staging
- (b) Management

3. **Clinical Skills:**

- a. Investigate and manage patients with benign lesions of the of the duodenum; determine need for operative intervention
- b. Investigate and manage patients with malignant neoplasms of the duodenum
- c. Stage the tumor pre and intra-operatively and determine resectability
- d. Perform appropriate resection including pancreatoduodenectomy
- e. Perform palliative procedures for unresectable tumors
- f. Participate in multidisciplinary tumor review conferences
- g. Recommend appropriate therapy for unresectable duodenal malignancies
- h. Recommend appropriate neo and adjuvant radiation and/or chemo therapy and interact with Medical and Radiation Oncologists
- i. Provide postoperative management including diagnosis and treatment of complications of duodenal resection and/or bypass

Unit 6 – **Oncology**

1. **Objectives:** Upon completion of this unit the trainee will:

- a. Understand the basic pathophysiology of neoplasia and the currently understood mechanisms of carcinogenesis
- b. Understand mechanisms of action of the classes of chemotherapeutic agents currently available for HPB malignancies
- c. Apply this understanding to the multidisciplinary management of HPB malignancies

2. **Content:**

a. **Basic pathophysiology of neoplasia**

- (1) Mechanisms of carcinogenesis
- (2) Genetic alterations
- (3) Viral carcinogenesis
- (4) Chronic inflammation
- (5) Tumor biology including the potential for metastases

b. Chemotherapy

- (1) Classes of drugs
- (2) Mechanisms of action
- (3) Toxicities
- (4) Combination therapy and available protocols

c. Multidisciplinary management

- (1) Relative roles of surgery, ablation, chemotherapy and radiation therapy as:
 - (a) Definitive management
 - (b) Neo and adjuvant therapy
 - (c) Therapy for recurrent disease
 - (d) Palliative therapy

d. Combined modality treatment

- (1) Transarterial chemoembolization (TACE)
- (2) Transarterial radioembolization (TARE)

e. Immunotherapy

- (1) Tumor immunology
- (2) Antibodies and cell-based immunotherapy – vaccines
- (3) Adoptive immunotherapy
- (4) Checkpoint blockade

3. Clinical Skills

- a. Apply knowledge of tumor biology, chemotherapy and radiation therapy to recommend an appropriate treatment strategy for the management of individual HPB malignancies
- b. Participate regularly in multidisciplinary tumor review conferences
- c. Interact with Interventional Radiologists, Medical Oncologists, Radiation Oncologists, Oncology Nurses and Allied Health Professionals, Palliative Care Physicians and Nurses

Unit 7 – Trauma

- 1. **Objectives:** Upon completion of this unit the trainee will understand:
 - a. The pathophysiology of blunt and penetrating trauma to the liver, biliary tract and portal structures, pancreas, duodenum and adjacent structures
 - b. Methods of assessment and diagnosis
 - c. Principles and techniques available to manage traumatic injuries

- d. Management of complications of trauma to the liver, biliary tract, pancreas and duodenum

2. **Content:**

a. **Liver trauma**

- (1) Mechanisms of injury and presentation
- (2) Diagnosis and classification of liver lacerations
- (3) Management
 - (a) Techniques of liver packing
 - (b) Angiography and embolization
 - (c) Liver parenchyma hemostasis techniques
 - (d) Total vascular exclusion +/- IVC shunt or veno-venous bypass for retrohepatic IVC and/or hepatic vein injuries Resection vs. peri-hepatic packing
- (4) Complications: diagnosis and management

b. **Biliary tract and portal structures**

- (1) Mechanisms of injury and presentation
 - (a) "External" trauma
 - (b) Operative injury during cholecystectomy
- (2)** Investigation, diagnosis and classification of bile duct injuries
 - (a) Identification of associated injuries
- (3)** Management
 - (a) Timing and role of ERCP + stent, HIDA scan and PTBD
 - (b) Principles and techniques of biliary reconstruction and access loop
- (4)** Complications: diagnosis and management

c. **Pancreatic and duodenal trauma**

- (1) Mechanisms of injury and presentation
- (2) Investigation, diagnosis
 - (a) Identification of pancreatic duct disruption
 - (b) Identification of duodenal injury
- (3) Management
 - (a) Indications for pancreatic resection
 - (b) Techniques for repair and exclusion methods for duodenal injuries

- (4) Complications: diagnosis and management

3. Clinical skills

- a. Consult and manage patients with blunt and penetrating trauma to the upper abdomen
- b. Evaluate injuries to the liver, biliary tract, pancreas and duodenum
- c. Evaluate post-cholecystectomy injuries to the bile duct and determine management strategy
- d. Perform emergency and elective operative procedures to resolve and/or repair injuries to the liver, bile duct, portal structures, pancreas, and duodenum
- e. Emergency operations for liver trauma including techniques of peri-hepatic packing
- f. Manage complications of operative intervention

Unit 8 – Transplantation

- 1. **Objectives:** Upon completion of this unit the trainee will have a working knowledge of:
 - a. Organ procurement and preservation
 - b. Indications and contraindications for liver transplantation
 - c. Outcomes including complications of transplantation
 - d. Application of pharmacological principles and pharmacokinetic knowledge in the practical management of Immunosuppression and its toxicities
- 2. **Content:**
 - a. Organ procurement
 - (1) Brain death and donor management
 - (2) Organ retrieval techniques
 - b. Living donor assessment
 - c. Living donor left or right hepatectomy
 - d. Organ preservation - principles and application
 - e. Transplantation
 - (1) End stage liver disease
 - (a) Hepatitis and acute liver failure
 - (i) Causes of acute liver failure
 - (ii) Investigation and prognosis (classification systems including King's College criteria)

- (iii) Treatment strategies
- (iv) Role of liver support systems
- (v) Role of liver transplantation
- (b) Chronic liver disease cirrhosis and portal hypertension
 - (i) Causes and natural history of cirrhosis
 - (ii) Complications of chronic liver disease
 - (iii) Diagnosis, staging and treatment options (including indications for liver transplantation)
- (iv) BuddChiari syndrome
- (2) Indications for liver transplantation
 - (a) Acute and chronic liver failure
 - (b) Hepatocellular carcinoma and other liver tumors
 - (c) Childs' and MELD scores and organ allocation
- (3) Techniques of liver transplant
 - (a) Transplant hepatectomy
 - (b) Liver transplant techniques
- (4) Techniques of Pancreas transplant
 - (a) Back bench reconstruction
 - (b) Pancreas transplant (whole organ and auto-islet)
- (5) Immunosuppression - drugs, mechanisms of action, toxicities and combination therapy
- (6) Complications of transplantation
 - (a) Surgical
 - (b) Infectious
 - (c) Immunologic

3. **Clinical Skills:**

- a. Apply understanding of liver transplantation to recommend a liver transplant to the appropriate patient at the appropriate time
- b. Recognize the complications and impact of immunosuppression and the increased risk of de-novo malignancies

Unit 9 – **BIO ETHICS**

1. **Objectives:**

The objective of the bioethics module are to build capacity in the identification and resolution of ethical dilemmas and to ensure that therapeutic medicine and medical research is conducted upholding the highest ethical standards.

2. Content:

The curriculum consists of an integrated teaching program where modules are supplemented by discussions during clinical teaching. The teaching methods are varied, with teaching integrated into the regular curriculum.

3. Clinical Skills

- a. Respect human life and the dignity of every individual
- b. Ethical considerations relating to liver transplant donors (including living donor, non-heart-beating donors). Criteria for brain death and appropriate recipients
- c. Treat all with competence and compassion and without prejudice
- d. Protect the privacy and confidentiality of those whom we manage
- e. Work freely with colleagues to discover, develop, and promote advances in medicine and public health
- f. Teach and mentor those who follow us, for they are the future of our caring profession.

IV. CLINICAL TRAINING

The students will be clinically trained in the parent HPB department during the 3 year course. Twenty seven of the 36 months will be spent in the parent unit. The rest of the 9 months in associated specialties (including an elective

posting of one month and will spend one more month at another institute of excellence)

Postings during the M Ch Hepato Pancreato Biliary Surgery Programme

	Year-I (months)	Year – II	Year - III
HPB	8	8	12
Gastroenterology	0	2(1 month in endoscopy)	0
Paediatric Surgery	0	1	0
Critical Care	1	0	0
Hepatology	1	0	0
Radiology	1	0	0
Medical Oncology	0.5	0	0
Pathology	0.5	0	0
Electives (preferably a centre doing liver transplantation if not done in parent dept.)	0	1 (including one month at centre of excellence)	0
Total	12	12	12

During II year, students are encouraged to undergo special postings for learning new advanced techniques / Procedure / Skills in institutions of higher repute where the requisite facilities are available without affecting the duties of the parent department.

V. SKILL TRAINING:

The student must have acquired certain surgical skills in a structured manner during the three year period of his course. These skills will be achieved by either assisting at the surgery or performing the surgery under the supervision of the teacher.

Year 1:

The trainee participates in the patient rounds and education programs of the HBP service and the transplantation program. The trainee will be on ward call for HPB in-patients. He will assist in HPB operations and perform some with assistance. He will attend a research methodology workshop and basic course in epidemiology. He is assigned to a research project which he will conceptualize, apply for and obtain Institutional Review Board clearance. He will help in maintaining the medical records and statistics.

Year 2:

Three months of the second year will be spent in peripheral rotation

Year 3:

The 3rd year offers in-depth advanced training in HPB surgery. The trainee completes his research project and is involved in acquiring operating skills. He will remain on call for all liver transplants (if available in the parent institution). In addition, the trainee has responsibility for all consultations. He will have an elective posting of one month and will spend one month at another institute of excellence

I year

Should have assisted in the following operations	Should have performed the following operations
• Cholecystectomies • Hepaticojejunostomy • Choledochal cyst excision • Choledochoduodenostomy • Palliative biliary-enteric bypass • Extended cholecystectomy • Non-anatomic liver resection • Excision hydatid cyst (Open & Laparoscopic) • Cysto-gastrostomy / jejunostomy • Enucleation of pancreatic tumor • Distal Pancreatectomy	• Exploratory laparotomy • Diagnostic/staging laparotomy and laparoscopy with biopsy • Cholecystostomy • Cholecystectomy (open and laparoscopic) • Common bile duct exploration • Liver biopsy • Liver abscess drainage

II year

Should have assisted in the following operations	Should have performed the following operations
• All HPB operations • Cadaveric organ retrieval • Liver explant (transplantation)	• Laparotomy for blunt injury abdomen (perihepatic packing) • Completion cholecystectomy • Choledochal cyst excision • Choledochoduodenostomy • Palliative biliary-enteric bypass • Extended cholecystectomy • Non-anatomic liver resection • Excision hydatid cyst
	• (Open & Laparoscopic) • Cysto-gastrostomy / jejunostomy • Enucleation of pancreatic tumor • Distal pancreatectomy

III year

Should have assisted in the following operations	Should have performed the following operations
• Liver Transplantation bench dissection • Liver Reimplantation (transplant)	• Transduodenal sphincteroplasty • Hepaticojejunostomy • Repair of benign bile duct stricture(simple)

• Complex liver and biliary operation(hilar cholangiocarcinoma) • Laparoscopic Pancreaticoduodenectomy • Pancreaticoduodenectomy (vascular reconstruction) • Portosystemic shunt operations	• Extended cholecystectomy with lymph nodal clearance and bile duct excision • Anatomical liver resection • Distal pancreatectomy Spleen sparing • Frey's Procedure • Pancreaticoduodenectomy • Pancreatic necrosectomy • Splenectomy for portal hypertension • Partial splenectomy • Cadaveric Liver / Pancreas / Kidney organ procurement
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VI. TEACHING METHODOLOGY

1. Planning session with entire faculty and students – once a week
2. Outpatient clinics – 2 days/week
3. Ward rounds - 6 days/week
4. Transplant clinic - 1 day/week
5. Peri-operative teaching sessions - 2 days/week
6. Academic session twice a week – including lectures, video teaching session, journal reading, symposium and guest lecture
7. Should attend atleast 2 national conferences / CME.

VII. RESEARCH WORK

The candidate is introduced to the field of research in HPB surgery

The candidate will be trained in the ability to

- Frame a research question
- Plan a study to answer the question
- Collect the relevant information and
- Evaluate appropriately collected data to draw a conclusion.

The candidate should become conversant with the reporting of these results as a research paper in journals and as a presentation in conferences.

The activities would consist of:

- o Planning and organizing relevant studies to be submitted as a Research paper at the end of the course.
- o Students should compulsorily attend Research Methodology workshop conducted by the University within first six months of M.Ch Course.

VIII. LOG BOOK:

The Postgraduate student of a Postgraduate Degree Course in Super specialties shall maintain Log Book of the work carried out by them and the training program undergone during the period of training including details of surgical operations assisted or done independently

The Log Book shall be checked and assessed by the faculty members imparting the training.

Periodical evaluation of Log Book to be done by the Head of the Department as per 52nd SAB.

The Evaluation of the candidates in both theory and practical aspects will help the candidate in the improvement of his/her knowledge skills & attitude.

IX. COMPETENCY ASSESSMENT:

Overall:

1. Communication / Commitment / Contribution /
Compassion towards patients and Innovation

- 10 Marks

2. Implementation of Newly learnt techniques	-	10 Marks
3. Documentation of case sheets / discharge Summary / Review	-	10 Marks
4. Number of cases presented in Clinical Meetings/ Journal Clubs / Seminars / Papers presented in Conference.	-	10 Marks
5. No. Of Medals/ Certificates won in the conference / Quiz competitions and other academic meetings with details.	-	10 Marks

Total		50 Marks

Assessment	I	- February	-	First Year
	II	- August	-	First Year
	III	- February	-	Second Year
	IV	- August	-	Second Year
	V	- February	-	Third Year
	VI	- May	-	Third Year

VIVA INCLUDING COMPETENCY ASSESSMENT – 100 Marks (50+50)

X. THEORY EXAMINATION

Paper I -Basic Sciences and General Principles in HPB Surgery

Paper II -HPB Surgery – Liver and transplantation

Paper III - PB Surgery – Pancreas and biliary

Paper IV- HPB as Applied to Allied Sciences and Recent Advances in HPB surgery

Each Paper will Contain:

1. Essay questions (2)	-	2 X 15	=	30 Marks
2. Short Notes (10)	-	10 X 7	=	70 Marks

Total				100 Marks

XI.CLINICAL EXAMINATION:

Particulars	Time for candidate to examine the cases	Time for examiners to question the candidates	Maximum Marks
Long Case	1 Case x 60 Minutes	60 Minutes	100
Short Case	2 Cases x 15 Minutes	30 Minutes	100
Ward Rounds	3 Patients x 10 Minutes	30 Minutes	100
OSCE	5 Stations x 3 Minutes	15 Minutes	50
Viva Voce		15 Minutes	100
Log Book			50
			500

As per Medical Council of India Post Graduate Medical Education Regulations 2000 (amended up to 10th August 2016) clause **13.9 A Postgraduate student of a Postgraduate degree Course in broad specialties/ Super Specialties would be required to present one poster presentation to read one paper at a National/State conference and to present one Research paper which should be published/accepted for publication/sent for publication during the period of his Postgraduate studies so as to make him eligible to appear at the Postgraduate Degree Examination.**

Apart from Poster/Oral paper presentation in National/State conferences, the Research paper published by the candidate in the University Journal of Medical Sciences will be considered as equivalent to the Research Paper as mentioned in 13.9. clause. Case Reports can also be published in University Journal of Medical Sciences but case reports will not be considered as Research Paper.

The candidate can also present Research Paper as per Clause 13.9 of Post Graduate Education Regulation 2000, and if the article sent for publication by the candidate as primary author or corresponding author which has not yet been published/accepted for publication, the candidate should submit a letter from the HOD, stating that the article sent for publication is of publishable merit and the proof of the Research Article submitted to the Journal for publication should be sent to the university forwarded through the HOD [as per 53rd SAB]

The student can submit articles to the University journal anytime from the time of registration till 6 months prior to theory examination.

XII. OSCE: 5 stations

1. Clinical photograph of clinical scenario
2. Clinical photograph of clinical scenario
3. Clinical photograph or video of Operative surgery
4. Photograph of Recent Advances in HPB Surgery or Equipment used in HPB surgery
5. HPB imaging

XIII. REFERENCE BOOKS

1. Surgery of the Liver, Biliary Tract and Pancreas by Blumgart.
2. Shackelford's Surgery of the Alimentary Tract
3. Transplantation of the Liver by Busuttil and Klintmann

****Note:** The editions are as applicable and the latest editions shall be the part of the syllabi.

XIV. JOURNALS

1. American Journal of Gastroenterology
2. HPB Journal.
3. Annals of Surgery.
4. Journal of Hepato-Biliary Pancreatic Sciences.
5. Journal of Gastrointestinal Surgery.
6. British Journal of Surgery.
