DM – Nephrology Syllabus

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DM – Nephrology Syllabus – RGUHS

Goals

- To train doctors in the scientific and clinical aspects of the specialty of Nephrology.
- To empower them to practice the specialty of Nephrology with competence, care, and compassion thereby delivering the highest standard of Nephrology care to the community.
- To empower the trainee in academic and research aspects of Nephrology, to empower the trainee to become an effective teacher and communicator in Nephrology
- To establish the required training methods, evaluation methodology, and qualifying norms for the successful completion of the DM course in Nephrology.

Statement of Objectives

1. To provide the candidate with the current, latest, scientific and evidence- based Knowledge pertaining to the above-mentioned areas in Nephrology.

2. To impart the Skills to undertake independent clinical practice in the above areas of Nephrology and to provide opportunities to the practice of these skills in a graded manner and under suitable supervision to a point where the candidate is capable of practicing these skills independently.

3. To inculcate in the candidate an Attitude of responsibility, accountability and caring; to empower the candidate with a good and sound foundation of Ethical Values in the practice of Urology; and to develop in the candidate the ability to effectively Communicate with patients, peers, superiors, and the community in the discharge of his/her clinical role.

4. To identify, frame and carry out research proposals in the specialty and to acquire a spirit of scientific inquiry which is oriented to the principles of research methodology and epidemiology.

5. To acquire thorough knowledge of internal medicine and allied general and clinical disciplines to ensure appropriate and timely referrals.

6. To acquaint with relevant education delivery system to be able to function as a health educator.

Course Content - DM Nephrology

1. Training will be exclusively on whole time in-service basis on the residency pattern.

2. The programme will impart a sound training in the diagnosis and management of patients with renal disorders.

3. During the training period, the candidate shall take part in all the activities of the department including inpatient and outpatient nephrology care, laboratory and investigative work up, lectures, seminars, conferences, group discussions and various other clinical and teaching assignments.

4. The candidate will work as a member of the renal team and will be given the responsibility of investigation and therapeutic care of all patients under the direct guidance of the faculty in Nephrology. He will be first on call for routine emergency renal consultants.

5. The predominant course related activity would involve working in the hospital outpatient department in patient wards, affiliated laboratories and diagnostic facilities.

6. Didactic teaching activities will include lectures, seminars, clinical presentations, journal clubs and topic discussions.

7. Practical teaching and learning activities will involve case presentations, demonstrations, imaging, diagnostic and therapeutic procedures and such other related activities.

8. Additional teaching and learning activities will include:
    a. Visits to other institution of excellence as and when needed
    b. Visit to laboratories, diagnostic facilities, affiliated clinical units and other areas, as may be deemed necessary from time to time.
    c. Attending continuing Education programmes, Seminars, Conferences, and Workshop in furtherance of course objectives.
    d. Presenting papers, topics, lectures, posters and similar activities to peer groups in furtherance of the learning and objectives of the course.

9. A minimum of 15-20 lectures/year covering the recent advances in all aspects of renal diseases would be delivered by consultant faculty. In addition, candidates will be required to attend the complete, short term basic and clinical courses on:

Bio-statistics

Research methodology and experimental lab medicine relevant to Nephrology. Bio ethics, ethical issues in transplantation including "Human Organ Transplant Act".

Interventional Procedures

A candidate will be required to have achieved proficiency in performing and supervising:

- Hemodialysis (HD machine disinfection, dialyzer reuse, priming, starling and closing dialysis),
- Peritoneal dialysis (catheter insertion, LIAPD training, PET test, Mechanical complications, peritonitis management and catheter removal).
- Renal biopsies. He would be expected to have performed a minimum of 50 renal biopsies.
- SLED, CVVHD, CRRT, Plasmapheresis.

- Intermittent peritoneal dialysis.
- Vascular Access. The candidate would also be expected to have inserted at least 50 internal jugular, 10 subclavian, 50 femoral vascular access catheters including perm cath insertion.

Investigative work-up

The candidate is expected to perform routine urine examination and ultrasonography. In addition, he / she must familiarize himself /herself with the following investigations:

Laboratory:

- Electrolyte and acid base analysis.
- Renal function tests.
- Auto analyzer functioning.
- Renal pathology interpretation including immune-fluorescence and electron microscopy.

Radiological:

- Intravenous urography.
- Micturating cystourethrography.
- Digital subtraction angiography.
- Selective renal angiography and interventional angioplasty and stenting.
- Selective renal venography.
- Doppler studies.
- Antegrade and retrograde pyelography.
- CT imaging.
- Magnetic resonance imaging.

Nuclear Medicine:

- Various renal isotope imaging and functional techniques

Urodynamic studies

- Invited guest lecturer by expert. 2 semester.

Microbiology:

- Viral, bacterial and fungal cultures, serological and PCR techniques.

Immunological test:

- ANCA, ANA, anti ds DNA, complement, anti GBM antibody, Cryoglobulin, immune electrophoresis. HBV DNA, HCV RNA and HIV viral load, BK Virus PCR, Free light chain assays. _____.

Tissue typing:

- Cross match, serological typing, molecular HLA typing, PRA. _____.

Research

Each candidate will be required to undertake research under the guidance of the faculty. They will be required to submit a research plan within 6 months after joining the course and submit a Project Report not later than 2 years after joining the course. In addition, the candidate will participate in all the departmental research activities.

Project

Every candidate shall carry work on an assigned research project under the guidance of a recognized post graduate teacher, the result of which shall be written up and submitted in the form of a Project report. The Project work is aimed at contributing to the development of a spirit of enquiry, besides acquaintance with the latest advances in medical science and the manner of identifying and consulting available literature.

a. *Guide*
The Project work shall be done under the guidance of the faculty recognized as post graduate teacher as per the norms laid down by the MCI. The HOD concerned may take decision on all allocation of a guide to each post graduate.

b. *Co-guide*
The faculty recognized as post graduate teacher as per the norms laid down by the MCI from the same or other departments who are involved in actively guiding the student may be proposed as co-guide is by the guide, subject to approval by the head of the department.

The non-medical scientists/statisticians who are actively involved in guiding the Project may also be proposed as co-guide/s by the guide, subject to the approval by the head of the department.

c. *The Project topic:*
The Project topic shall be chosen before the end off six months from the date of joining the course. Shall there be undue delay in selecting the initiating the project. The tenure of course shall deemed to be extended by the 6 months or as the case may be the project protocol shall be submitted to institutional Ethics Committee (IEC) for clearance.

The student should submit five copies of the project, six months before the final examination to the controller of examinations. Only those students whose project work have been approved by the institutional Head/HOD shall be conducted. Project evaluation report will be considered as eligibility to appear for final examinations.

External Posting and Research Activities:

The post graduate student of super specialties would be required to present :

- One poster presentation at national/state conference
- Three oral paper presentation at a national/state conference.
- One publication it is desirable though not mandatory that a research paper be written for publication during the period of their training.
- Paper presentation is necessary to make student eligible to appear for the postgraduate degree examination.

External Posting:

The HOD concerned may decide for one month external posting if deemed university.

Training Programme:

The candidate joining the course must work as full time resident during the period of his/her post graduate training.

a. Teaching /learning methods:
   a) Learning will essentially by self-learning.
   b) Following teaching – learning methods shall be followed.
      - Group teaching sessions
      - Journal review
      - Submit seminar presentation
      - Group discussion
      - Clinical case presentations pertaining to the speciality
      - Presentation of the findings of an exercise on any of the sub-specialities.
      - Participation in CME programs and conferences.

Internal assessment:

Internal assessment will be done to assess the training and to identify the strengths and weakness of the postgraduate student while they present seminars, cases and journal club.

Internal assessment in form of 3 theory papers and 2 short cases with 4 bed side cases every year.

Internal assessment informs practical's 2 short cases and slide and imaging films once in 6 months.

Internal assessment will be done in institution LB/Project on rotation based in January/June.

Log Book.

a. The log book with details of duration of postings, skills performed with remarks of the teacher / faculty member will be maintained and periodically updated by the postgraduate student.

b. Maintenance of Log Book:
   i. The postgraduate 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.
   ii. The candidate should also be required to participate in the teaching and training programme of postgraduate and paramedical students.
   iii. In addition, the Head of the Department shall involve their postgraduate candidates in seminars, journal clubs, group discussions and participation in clinical meetings and conferences.

iv. Every postgraduate candidate should be encouraged to present short title papers in conferences and improve on it and submit them for publication in required medical journals.
v. The_____ shall scrutinize the Log Book every three months.
vi. At the end of the course, the candidate should the contents and get the log book certified by the Head of the Department.
vii. The Log book should be submitted at the time of practical examination for the scrutiny of the Board of Examiners.

c. Research work to be assessed and reviewed once in four months by the Chief Guide and the Head of the unit.

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

Course Syllabus

Normal Renal Structure and Function:

1. Anatomy of the Kidney
2. Developmental Biology of the Kidney
3. Biology of Renal cells in culture
4. Cell-Cell and Cell-Matrix interactions
5. The Metabolic Basis of Solute Transport
6. The Molecular Basis of Solute Transport
7. The renal circulations
8. Glomerular filtration
9. Renal handling of water
10. Renal transport of various electrolytes and solutes
11. Renal acidification mechanisms
12. Cell biology of vasopressin action
13. Urine concentration and dilution
14. Renal handling of organic anions and cations
15. Vasoactive agents, peptides and the kidney
16. Arachidonic acid metabolites and the kidney
17. Control of body fluid, components and extra-cellular fluid volume, pathophysiology of fluids & electrolyte disorders, pathophysiology of edema formation.
18. Pathophysiology of water metabolism.

Fluid and electrolyte disorders:

1. Acid base disorders
2. Disorders of sodium, potassium-balance
3. Disorders of calcium, magnesium urate and phosphate metabolism
4. Disorders of water balance

Renal Diseases

1. Epidemiology of renal disease and approach to a patient with renal disease.
2. Laboratory assessment of kidney disease: Clearance, urinalysis and kidney biopsy.
3. Interpretation of urine electrolyte and acid-base parameters.
4. Radiologic assessment of the kidney.
5. Acute renal failure and chronic renal failure.
6. Primary glomerular diseases.
7. Secondary glomerular diseases.
8. Tubulo interstitial diseases.
9. Urinary Tract Infection, Polynephritis and reflux nephropathy.
10. Disorders of the Renal Arteries and Veins.
11. Micro vascular diseases of the kidney
12. Toxic Nephrology.
13. The Kidney and Hypertension in pregnancy.
14. Inherited disorders of the renal tubule.
15. Cystic diseases of the kidney.
16. Diabetic Nephropathy.
17. Nephrolithiasis.
18. Urinary Tract Obstruction.
19. Renal Neoplasia
20. Glomerular diseases in the tropics
21. Renal diseases in children

Pathophysiology of Renal Disease

1. Renal and systemic manifestations of glomerular disease
2. Adaptation to Nephron loss
3. Vascular Wall in hypertension
4. Essential hypertension
5. Renovascular hypertension and Ischemic Nephropathy
6. Hypertension and Renal disease
7. Pathophysiology of uremia
8. Hematologic consequences of renal failure
9. Cardiovascular aspects of chronic kidney disease
10. Neurological complications of renal insufficiency
11. Renal osteodystrophy
12. Effects of ageing of renal function and disease
13. Renal function in the newborn infant and children

Management of a patient with renal failure

1. Diuretics
2. Antihypertensive drugs
3. Specific pharmacological approaches to clinical renoprotection
4. Nutritional therapy in renal disease
5. Erythropoietin therapy in renal disease and renal failure
6. Hemodialysis
7. Peritoneal dialysis
8. Intensive care Nephrology
9. Extracorporeal Treatment of poisoning
10. Transplantation immunobiology
11. Donor and recipient issues in renal transplantation
12. Clinical aspects of renal transplantation
13. Prescribing drugs in renal disease

Miscellaneous

1. Bio-statistics and clinical epidemiology
2. Ethics, psychosocial, economics and management of renal diseases. Human organ transplant act and medico-legal aspects of transplantation.

Recent Advances

Apart from the topics listed above, the advances in the field of nephrology would include relevant publications of importance to the field of Nephrology including in review articles, original publications and communications at premier scientific meetings in Nephrology.

Text Books for reference

The following textbooks are recommended for reference:

1	Brenner & Rector's the kidney Vol. 1 & Vol. 2	Brenner, Barry M et al
2	Critical Care Nephrology	Ronco, Claudio
3	Comprehensive Clinical Nephrology	Johnson, Richard J
4	Diseases of the Kidney, Vol. 1,2 & 3	Scrier, Robert W
5	Heptinstall's Pathology of the Kidney Vol. 1 & 2	Jennette, J Charles
6	Oxford Textbook of clinical nephrology, Vol. 1, 2 & 3	Davison, Alex M
7	Renal physiology	Vander, Arthur J
8	Kidney Disease in Primary Care	Mandal, Anil K
9	Therapy in Nephrology and Hypertension: Comapanion to Brenner and Rector's the kidney	Bradt, Hugh R
10	Kidney Transplantation: Principles and practice	Morris, Peter J
11	Interpretation of Renal biopsies	Chitale, Arun
12	Recent advances in nephrology	
13	Review of hemodialysis for nurses and dialysis personnel	Gutch C.F
14	Clinical dialysis	Nissenson, Allen R
15	Replacement of renal function by dialysis	Jacobs C

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List of Recommended Journals

- Kidney International
- American Journal of Kidney Diseases
- Nephrology, Dialysis & Transplantation
- Transplantation
- Dialysis and Transplantation
- Current opinion in Nephrology & Hypertension
- New England Journal of Medicine
- Indian Journal of Nephrology
- Indian Journal of Peritoneal Dialysis
- Indian Journal of Critical Care Medicine
- Journal of Association of Physicians of India
- Journal of American Society of Nephrology
- New England J of Medicine
- Nephrology Dialysis and Transplantation
- Lancet

- Seminars in nephrology

Schedule of training Activities

Clinical schedule of training activities include the following:

Topic Discussion (Basic Sciences related to Nephrology) I Topic Discussion (General Nephrology) /Topic Discussion (Drugs) / Topic Discussion (Dialysis) / Topic Discussion (Transplantation).
Seminar once in 2 week.
Journal Club once in 2 weeks
Dialysis/OPD meeting once a month
Nephro-Pathology meeting twice a month
Nephro - Urology seminars once a month
Nephro-Radiology meeting once a month
Mortality meeting once a month
Outpatient Nephrology care including renal transplantation clinic
Case presentation twice a week
Bed side Rounds daily
Grand Rounds once in 10 days
Consultation daily
Transplantation clinic twice weekly

Frequency of training activities would include all the above activities and frequency to be determined by the department based on the available time ensuring that teaching activities are conducted on all working days.

Rotations in various areas of Nephrology

Each candidate will go through the following rotations in various areas/subspecialities of nephrology during 3 years of training in Nephrology.

1. Ward posting — 1 year
2. Dialysis (HD and CAPD) — 6 months
3. Renal Transplantation — 6 months
4. Out patients — 3 months
5. Allied depts. & external posting — 3 months
   The candidate would be involved in the pre-transplant, immediate post transplant and late post - transplant medical management of renal transplant recipients and the donors including immunosuppressive therapy, immunological monitoring, diagnostic and therapeutic interventions in patients with allograft dysfunction including renal allograft biopsy and ultrasound evaluation of the graft.
6. Critical care Nephrology — 3 months
   (will be part of ward posting)
   Intensive care nephrology including management of electrolyte and acid base problems, CRRT and dialysis of critically ill patients with multi-organ failure.

7. Interventional Nephrology 3 months
(will be part of ward posting)

Examination for the award of Degree DM Nephrology

Panel of Examiners:

Total number of examiners required -	Four	
Internal Examiners	-	Two
External Examiners	-	Two

All the external examiners should be from outside the state of Karnataka.

Internal examiners may be from within the institute or within the state. However, if the examiner who evaluated the dissertation but not in a position to attend the practical/viva examination, the institute can nominate another examiner from among the panel recommended by the concerned HOD.

Examination:

The examinations shall be organized, on the basis of marking system to evaluate and certify candidates level knowledge, skill and competence at the end of the training and obtaining a minimum of 50% marks in each theory paper, practical and viva examinations shall be mandatory for passing the examination. The examinations shall be held before the end of 3 academic years.

i. ***Number of candidates***

i. The maximum number of candidates to be examined in Clinical/practical and oral on any day shall not exceed three for DM examinations.

ii. *The examination for the degree shall consist of written (theory) examination, Practicals / Clinicals and Vice Voce.*

iii. Theory
There shall be the following four theory papers:

1. Basic Medical Sciences pertains to Nephrology
2. Clinical Nephrology
3. Dialysis and Transplantation
4. Recent advances in Nephrology

The theory examination will be held at least one week before the start of the Practical Clinical and oral examination.

Practical/Clinical and Oral.

Practical/Clinical examination shall consist of carrying out special investigative techniques for Diagnosis and therapy. Oral examination shall be comprehensives to test the candidate's overall knowledge of the subject.

i) Distribution of Marks

	Duration	Marks
Basic Sciences	3 Hrs.	100
Clinical Subjects I	3 Hrs.	100
Clinical Subjects II	3 Hrs.	100
Recent advances	3 Hrs.	100
Practicals/Clinicals	3 Hrs.	200
Viva Voce		100
	Total Marks	700

ii) Examination
Theory examination duration: 3hrs.

Model paper:
Total marks for each paper: 100

i) Total 10 questions allotting 20 marks for one long question and 10 marks each for remaining 8 questions: 3hrs.

ii) Practical Clinical examination:
DM student shall appear for practical exam on given date with
   a) Logbook duly signed by HOD.
   b) Project report duly signed by HOD.

c) Long case - 100 marks time 1 hour
d) 2 Short cases - 50 marks
e) Ward rounds 4 cases - 50 marks
f) Viva Voce - viva - Viva – 50 marks
Histopath slides – 25marks
Radioimaging projections – 25marks

EVALUATION

The purpose of continuous course assessment is mainly.

i. To ensure the habits of regularity, punctuality and disciplined working amongst postgraduates.
ii. To give periodic feedback regarding their performance for med course correction steps to enhance their learning in various area i.e. patient care, research teaching, administration etc.
iii. To monitor attainment of clinical and technical skills to ensure adequacy of training.
iv. To be available to the internal examiner at the time of final examinations to discount the possibility of a single adverse performance influencing the pass or fail situation by using it to give an idea of the continued performance of the candidate during the three years of training to the external examiners, so that candidates who have otherwise been rated as satisfactory in their internal evaluation can be given more chances in the final examinations to more questions and overcome the adverse effects of doing badly in any one case. However, internal evaluation marks cannot directly be used for influencing the outcome of the summative assessment in the course of using it to fail a candidate who has otherwise done well in the final examinations or to pass a candidate who has done consistently bad in several cases.

Proformas for Internal Evaluation form for Postgraduates Clinical Work.

(To be completed once in 6 months by respective Unit Heads)

Name: Date:

Points to be considered:

1. Punctuality
2. Regularity of attendance
3. Quality of Ward Work
4. Maintenance of case records
5. Presentation of cases during rounds
6. Investigations work – up
7. Bedside manners
8. Rapport with Patients
9. Undergraduate teaching (if applicable)
10. Others:

Guidance for Scoring:

1	2	3	4	5
Poor	Below Avg.	Average	Above Avg.	Very Good

Score : ( )

Signature :

Proformas for Internal Evaluation form for Postgraduate's Seminar

Name: Date:

1. Presentation
2. Completeness of preparation
3. Cogency of presentation
4. Use of audiovisual aids
5. Understanding of subject
6. Ability of answer questions
7. Time scheduling
8. Consulted all relevant literature
9. Overall performances
10. Others:

Guidance for Scoring:

1	2	3	4	5
Poor	Below Avg.	Average	Above Avg.	Very Good

Score : ( )

Signature :

Proformas for Internal Evaluation form for Postgraduate's Continuous Evaluation of Project Work

Name: Date:

Points to be considered:

1. Interest shown in selecting a topic
2. Appropriate review
3. Discussion with guide and other faculty
4. Quality of protocol
5. Preparation of proforma
6. Regular collection of case material
7. Depth of analysis/discussion
8. Departmental presentation of findings
9. Quality of final output
10. Defence in Viva
11. Others:

Guidance for Scoring:

1	2	3	4	5
Poor	Below Avg.	Average	Above Avg.	Very Good

Score : ( )

Signature :

Proformas for Internal Evaluation form for Postgraduate's Continuous Evaluation of Project Work

Name: Date:

Points to be considered:

1. Choice of articles
2. Cogency of presentation
3. Whether he has understood the purpose of the article
4. How well did he defend the article
5. Whether cross references have been consulted
6. Whether other relevant publications have been consulted
7. His Overall impression of articles
   If good – reasons:
   If poor – reasons:
8. Audiovisual aids
9. Response to questioning
10. Overall presentation
11. Others:

Guidance for Scoring:

1	2	3	4	5
Poor	Below Avg.	Average	Above Avg.	Very Good

Score : ( )

Signature :