



THEORY

SEMESTER – IV

PAPER CODE	SUBJECT NAME	THEORY HOURS	PRACTICAL HOURS	THEORY MARKS	PRACTICAL MARKS
DDT401	NATIONAL HEALTH PROGRAMMES	45 Min	1 Hrs.	50	50
DDT402	HEALTHCARE DELIVERY SYSTEM	45 Min	1 Hrs.	50	50
DDT403	CONCEPTS OF RENAL DISEASE, DIALYSIS & NUTRITION	45 Min	1 Hrs.	50	50
DDT404	APPLIED DIALYSIS THERAPY TECHNOLOGY	45 Min	1 Hrs.	50	50

NATIONAL HEALTH PROGRAMMES

THEORY

1. Introduction to National Health Programmes

- Definition, objectives, and importance of National Health Programmes in India
- Evolution of health programmes in India (Bhore Committee to National Health Policy)
- Role of health workers and paramedical staff in implementing programmes
- National Health Mission (NHM) – overview

2. Communicable Disease Control Programmes

- National Tuberculosis Elimination Programme (NTEP)
 - DOTS strategy, diagnosis & treatment basics
- National AIDS Control Programme (NACP)
 - HIV transmission, dialysis precautions, ART centres
- National Viral Hepatitis Control Programme (NVHCP)
 - Hepatitis B & C prevention, vaccination, relevance in dialysis units
- National Leprosy Eradication Programme (NLEP)
- National Vector Borne Disease Control Programme (NVBDCP)
 - Malaria, dengue, chikungunya, filariasis – prevention & control

3. Non-Communicable Disease Control Programmes



- National Programme for Prevention & Control of Cancer, Diabetes, Cardiovascular Diseases & Stroke (NPCDCS)
 - Screening, prevention, dialysis relevance in diabetes & hypertension
- National Programme for Prevention & Control of Fluorosis (NPPCF)
- National Tobacco Control Programme (NTCP)
- National Programme for Health Care of the Elderly (NPHCE) – geriatric care relevance

4. Maternal & Child Health Programmes

- Reproductive, Maternal, Newborn, Child and Adolescent Health (RMNCH+A)
- Janani Suraksha Yojana (JSY)
- Janani Shishu Suraksha Karyakram (JSSK)
- Integrated Child Development Services (ICDS)
- Universal Immunization Programme (UIP) – vaccines schedule

5. Nutrition & Public Health Programmes

- Mid-Day Meal Programme
- National Iodine Deficiency Disorders Control Programme (NIDDCP)
- National Anaemia Control Programme (NACP)
- National Nutrition Mission (POSHAN Abhiyaan)

6. Occupational & Environmental Health Programmes

- National Programme for Control & Treatment of Occupational Diseases
- National Programme on Climate Change & Human Health (NPCCHH)
- National Mental Health Programme (NMHP)

7. Health Insurance & Supportive Schemes

- Ayushman Bharat – Pradhan Mantri Jan Arogya Yojana (PM-JAY)
- Pradhan Mantri National Dialysis Programme (PMNDP) – free dialysis scheme
- Rashtriya Swasthya Bima Yojana (RSBY)
- State-level health insurance schemes (overview)

8. Role of Dialysis Technician in National Health Programmes

- Infection control in dialysis centres (HIV, Hepatitis B & C, TB prevention)
- Educating patients about government schemes (PMNDP, health insurance)
- Assisting in patient registration and reporting for notifiable diseases
- Participation in screening programs for diabetes, hypertension, kidney disease
- Maintaining dialysis records for public health reporting

PRACTICAL

➤ Awareness & Patient Education

- Educating patients/families about:



- **Pradhan Mantri National Dialysis Programme (PMNDP)** – free dialysis scheme
- HIV/AIDS awareness (safe practices in dialysis units)
- Hepatitis B & C prevention & vaccination
- Diabetes & hypertension control for kidney health
- Conducting **patient awareness talks** on nutrition, hygiene, and infection prevention

➤ **Infection Control & Communicable Diseases**

- Practical training in **universal precautions** (hand hygiene, PPE use)
- Demonstration of **disinfection procedures** in dialysis units
- Screening & reporting protocols for **HIV, Hepatitis, TB** in dialysis patients
- Waste segregation & disposal as per **Biomedical Waste Rules**
- Observing vaccination drives (Hepatitis B, BCG, Polio, etc.) in health centres

➤ **Non-Communicable Disease Programmes (NPCDCS & NPHCE)**

- Measuring & recording **BP, weight, BMI** of patients (screening for hypertension, obesity, diabetes)
- Recording **blood sugar levels** with glucometer (under supervision)
- Preparing case reports of dialysis patients with diabetes & hypertension
- Participating in community health camps for **screening kidney disease**

➤ **Maternal & Child Health (RMNCH+A, UIP)**

- Observation of immunization sessions in health centres
- Assisting in health education about **antenatal care, nutrition, anaemia prevention**
- Demonstration of **Iron & Folic Acid supplementation programme**
- Case study preparation on **pregnant women with chronic kidney disease**

➤ **Nutrition & Public Health**

- Patient counselling on **renal diet** (low salt, potassium, phosphate) in line with nutrition programmes
- Demonstration of balanced diet chart for dialysis patients
- Participation in **National Nutrition Mission / Poshan Abhiyaan** awareness activities

➤ **Occupational & Environmental Health**

- Educating dialysis patients about **mental health support & counselling** (NMHP)
- Awareness activities about tobacco cessation (NTCP)
- Preparing posters/charts on **environmental sanitation & clean water** (important for dialysis patients)

➤ **Health Insurance & Government Schemes**



- Practical training in **registration of patients** under Ayushman Bharat / PMNDP
- Filling health records & online reporting formats (if available)
- Preparing a case study on a dialysis patient benefitting from **government health insurance**
- Role play exercise: Explaining PMNDP benefits to a new dialysis patient

➤ **Documentation & Reporting**

- Maintaining dialysis patient registers as per programme guidelines
- Preparing monthly reports of dialysis patients with co-morbidities (diabetes, hypertension, TB, hepatitis)
- Submitting case studies / project work on awareness campaigns conducted
- Familiarization with **National Health Mission (NHM) reporting system**

HEALTHCARE DELIVERY SYSTEM

THEORY

1. Introduction to Healthcare Delivery System

- Concept of health and disease
- Determinants of health (biological, social, environmental, economic)
- Healthcare system: definition, goals, and objectives
- Levels of healthcare delivery: **primary, secondary, tertiary care**
- Role of dialysis technician in healthcare delivery

2. Healthcare Delivery in India

- Structure of healthcare system in India (rural & urban)
- Sub-centres, Primary Health Centres (PHC), Community Health Centres (CHC)
- District hospitals, specialty & super-specialty hospitals
- Private sector & NGOs in healthcare delivery
- Role of AYUSH systems in healthcare

3. National & International Health Organizations

- Ministry of Health & Family Welfare (MoHFW) – functions & schemes
- Indian Council of Medical Research (ICMR)
- National Health Mission (NHM)
- World Health Organization (WHO) – structure & functions
- UNICEF, Red Cross, and other international agencies

4. Health Policies & Programmes in India

- National Health Policy (1983, 2002, 2017 – overview)
- Pradhan Mantri Jan Arogya Yojana (PM-JAY) under Ayushman Bharat
- Pradhan Mantri National Dialysis Programme (PMNDP)
- Public-private partnerships in healthcare delivery
- Telemedicine & e-health initiatives in India



5. Organization of Hospital Services

- Types of hospitals (teaching, non-teaching, corporate, specialty, superspecialty)
- Organization of hospital departments: OPD, IPD, ICU, dialysis unit, OT
- Hospital support services: pharmacy, laboratory, radiology, dietary, housekeeping
- Patient admission & discharge procedures
- Role of paramedical staff in hospital management

6. Primary Healthcare & Preventive Services

- Principles of Primary Health Care (Alma-Ata Declaration)
- Health promotion, disease prevention, curative and rehabilitative services
- National Health Programmes and their integration at primary level
- Community participation in healthcare delivery
- Family planning & maternal-child health services

7. Referral System & Continuum of Care

- Concept and need for referral
- Referral from sub-centre → PHC → CHC → district hospital → tertiary hospital
- Role of dialysis technician in referral for CKD patients
- Home-based care & palliative care support for dialysis patients

8. Health Information System & Records

- Importance of health records in healthcare delivery
- Types of health records (manual & electronic)
- Electronic Medical Records (EMR) in dialysis units
- Medical ethics, confidentiality, and legal aspects in patient data management

9. Healthcare Financing & Insurance

- Sources of healthcare financing (public, private, health insurance)
- Central & state government funding in health
- Rashtriya Swasthya Bima Yojana (RSBY)
- Ayushman Bharat & other state health insurance schemes
- Free dialysis services under government programmes

10. Challenges & Recent Advances in Healthcare Delivery

- Urban-rural disparities in healthcare delivery
- Shortage of human resources in health sector
- Role of technology: telemedicine, AI, digital health records
- Public health emergencies (COVID-19, epidemics) and response systems
- Future trends in healthcare delivery in India

PRACTICAL



➤ **Orientation & Observation**

- Visit and orientation to:
 - Sub-centre, PHC, CHC, district hospital, tertiary hospital
 - Dialysis unit in secondary & tertiary care hospitals
 - Private hospitals & charitable healthcare centres
- Observation of workflow in dialysis unit, OPD, ICU, and lab services

➤ **Patient Admission & Hospital Services**

- Demonstration of **patient admission and discharge procedures**
- Preparing a **patient case sheet** (demographics, diagnosis, treatment)
- Visit to **pharmacy, laboratory, radiology, dietary, and biomedical waste units**
- Observation of hospital referral system (patient flow from PHC → higher centre)

➤ **Role of Dialysis Technician in Health Delivery**

- Practical exposure to **dialysis patient registration** under Pradhan Mantri National Dialysis Programme (PMNDP)
- Assisting in counselling of CKD patients about **government health schemes (PMJAY, RSBY, state insurance)**
- Preparation of **awareness material** (posters/pamphlets) on kidney health & dialysis services

➤ **Infection Control & Quality Practices**

- Hand hygiene and PPE demonstration in dialysis units
- Disinfection and sterilization procedures in dialysis setup
- Biomedical waste segregation and disposal methods (as per BMW rules)
- Maintaining infection control checklist in dialysis centre

➤ **Health Information System & Records**

- Practical training in **manual dialysis registers** (patient details, sessions, outcomes)
- Exposure to **Electronic Medical Records (EMR)** and online reporting (if available)
- Preparation of sample **monthly dialysis unit report** for submission to health authority
- Case study on patient confidentiality & ethics in record-keeping

➤ **Community & Preventive Health Activities**

- Observation of **health awareness camps** (diabetes, hypertension, CKD screening)
- Participation in **blood pressure & blood sugar screening** of community members (under supervision)
- Assisting in **health education sessions** on hygiene, renal diet, and lifestyle



- modification
- Preparing a report on **referral of CKD patients** from PHC/CHC to higher centres
- **Health Insurance & Financing (Applied Training)**
 - Demonstration of **Ayushman Bharat / PMJAY patient registration process**
 - Hands-on practice in filling **insurance claim forms** (dialysis package)
 - Case presentation of a dialysis patient benefitting from **PMNDP / insurance schemes**
- **Project Work & Evaluation**
 - Each student to prepare a **project/report** on:
 - Structure of healthcare delivery in their district
 - Functioning of a dialysis centre under PMNDP
 - Comparison of dialysis services in public vs private hospitals
 - Viva-voce based on case reports and practical exposure

CONCEPTS OF RENAL DISEASE, DIALYSIS & NUTRITION

THEORY

1. Basics of Kidney & Renal Physiology

- Anatomy of kidney and urinary system
- Physiology of urine formation (filtration, reabsorption, secretion)
- Regulation of fluid, electrolyte, and acid-base balance
- Hormonal functions of kidney (erythropoietin, renin, vitamin D activation)

2. Introduction to Renal Diseases

- Definition and classification of renal diseases
- Acute Kidney Injury (AKI) – causes, symptoms, stages, management overview
- Chronic Kidney Disease (CKD) – stages, clinical features, complications
- End Stage Renal Disease (ESRD)
- Nephrotic syndrome, glomerulonephritis, polycystic kidney disease (overview)
- Common comorbidities: Diabetes & Hypertension leading to CKD

3. Diagnostic Approaches in Renal Diseases

- Clinical examination of renal patients
- Laboratory investigations: urine analysis, blood urea, serum creatinine, electrolytes
- Imaging techniques: USG, CT, MRI (basic understanding)
- Renal biopsy (overview – technician's role in specimen handling)

4. Principles of Dialysis

- Concept of dialysis: definition & purpose



- Principles of diffusion, osmosis & ultrafiltration
- Hemodialysis: mechanism, dialyzer function, blood & dialysate flow
- Peritoneal dialysis: mechanism & comparison with hemodialysis
- Indications for dialysis (AKI, CKD, poisoning, electrolyte imbalance)

5. Hemodialysis Procedures & Care

- Vascular access: AV fistula, AV graft, central venous catheters
- Dialysis machine components & circuit overview
- Dialysis session steps – preparation, initiation, monitoring, termination
- Complications during dialysis (hypotension, cramps, infection, clotting)
- Post-dialysis care & patient education

6. Peritoneal Dialysis (Basics)

- Types of peritoneal dialysis (CAPD, APD)
- Catheter insertion & care
- Indications, advantages & limitations
- Complications (peritonitis, catheter blockage)

7. Nutrition in Kidney Diseases

- Role of diet in renal disease & dialysis
- Energy, protein, carbohydrate, fat requirements in CKD
- Protein restriction in pre-dialysis CKD; protein requirement in dialysis patients
- Electrolyte management: sodium, potassium, calcium, phosphate restrictions
- Fluid restriction & monitoring
- Renal diet charts (veg & non-veg examples)
- Nutritional supplements in dialysis patients

8. Anemia & Bone Disease in CKD

- Pathophysiology of anemia in CKD
- Role of erythropoietin & iron therapy
- Renal osteodystrophy: causes, prevention & management
- Nutritional support in anemia & bone disease

9. Patient Education & Counselling

- Educating patients about dialysis schedule & compliance
- Lifestyle modifications in CKD (diet, exercise, smoking/alcohol cessation)
- Importance of vaccination in dialysis patients (Hepatitis B, Influenza, Pneumococcal)
- Psychological aspects & counselling support for CKD patients

10. Recent Advances & Future Trends

- High-flux dialysis & hemodiafiltration (overview)
- Wearable & portable dialysis machines



- Advances in renal transplantation
- Role of nutrition & supplements in improving dialysis outcomes

PRACTICAL

➤ **Clinical Examination & Case Study**

- Recording vital signs (BP, pulse, respiration, temperature) in renal patients
- Clinical observation of edema, pallor, dehydration in kidney disease patients
- Preparation of case sheets for CKD/AKI patients

- Documentation of patient history: comorbidities (diabetes, hypertension)

➤ **Laboratory Investigations (Observation & Practice)**

- Urine routine & microscopy (albumin, sugar, microscopy findings)
- Blood tests relevant to renal disease: urea, creatinine, electrolytes
- Interpretation of lab reports (high/low potassium, calcium, phosphate)
- Recording & maintaining investigation reports of dialysis patients

➤ **Dialysis Principles (Demonstration & Hands-On)**

- Demonstration of **dialysis machine components** (blood pump, dialyzer, dialysate system)
- Practice on **priming the dialysis circuit** under supervision
- Observation of **initiation, monitoring, and termination** of hemodialysis
- Identification of dialysis complications during sessions (hypotension, cramps, clotting)
- Observation of **peritoneal dialysis procedure** (CAPD exchanges)

➤ **Vascular Access Care (Applied Skills)**

- Observation of AV fistula examination (thrill, bruit)
- Assisting in AV fistula/AV graft dressing
- Central venous catheter care (dressing, infection prevention)
- Reporting access-related complications (bleeding, infection, clotting)

➤ **Nutrition in CKD & Dialysis (Practical Applications)**

- Preparation of **renal diet charts** (pre-dialysis CKD vs dialysis patients)
- Calculating daily protein, sodium, potassium, and fluid allowances
- Role play exercise: **counselling a dialysis patient** about fluid & diet restrictions
- Identifying foods **high/low in potassium, phosphate, sodium**
- Case study on **malnourished dialysis patient** & diet modification

➤ **Anemia & Bone Disease Management (Observation/Practice)**



- Demonstration of **erythropoietin injection administration** (observation only)
- Recording Hb levels & correlating with CKD anemia
- Identifying clinical signs of renal bone disease (bone pain, fractures)
- Dietary counselling for phosphate restriction & calcium supplementation

➤ **Patient Education & Counselling**

- Educating patients on importance of **dialysis schedule adherence**
- Counselling on **fluid intake & output monitoring**
- Awareness session on **vaccination for dialysis patients** (Hepatitis B, Influenza, Pneumococcal)
- Psychological support role play: handling anxiety/depression in dialysis patients

➤ **Project Work & Documentation**

- Each student to prepare a **dialysis patient case study report** (history, lab results, treatment, diet plan)
- Maintaining **dialysis records & diet counselling charts**
- Presentation on **recent advances in dialysis & nutrition**

APPLIED DIALYSIS THERAPY TECHNOLOGY

THEORY

1. Principles of Dialysis Technology

- Review of hemodialysis principles: diffusion, osmosis, ultrafiltration
- Dialysis adequacy concepts: Kt/V, URR (Urea Reduction Ratio)
- Dialysis prescriptions: duration, frequency, blood flow rate, dialysate flow rate
- Water treatment in dialysis: stages of purification (softener, carbon filter, RO, UV)

2. Hemodialysis Machines & Components

- Types of dialysis machines (single pump, double pump, portable, home dialysis units)
- Blood pump, dialysate delivery system, heparin pump, ultrafiltration control
- Alarm systems in hemodialysis machines (air, blood leak, conductivity, temperature)
- Dialyzers: hollow fiber, high flux, reuse methods (pros & cons)

3. Vascular Access in Dialysis

- AV fistula, AV graft, central venous catheters (temporary & permanent)
- Complications of access (infection, thrombosis, stenosis)
- Care & monitoring of vascular access during dialysis
- Nursing & technician role in vascular access management



4. Dialysis Procedures (Applied)

- Patient preparation before dialysis (assessment, weight, BP, lab tests)
- Steps of initiating hemodialysis
- Monitoring patient during dialysis (vital signs, symptoms, machine parameters)
- Termination of dialysis & post-dialysis care
- Peritoneal dialysis: CAPD, CCPD – procedure, indications, complications
- CRRT (Continuous Renal Replacement Therapy): basics & ICU role

5. Dialysis Complications & Emergency Management

- Intra-dialytic complications: hypotension, muscle cramps, air embolism, arrhythmia, seizures
- Long-term complications: anemia, bone disease, malnutrition, infections
- Emergency protocols in dialysis units (cardiac arrest, anaphylaxis, power failure)
- Handling accidental blood spills & infection exposure

6. Infection Control in Dialysis Units

- Standard precautions (hand hygiene, PPE, safe injection practices)
- Disinfection & sterilization of dialysis machines, dialyzers, and water system
- Biomedical waste management specific to dialysis centres
- Vaccination protocols for patients & staff (Hepatitis B, Influenza, Pneumococcal)

7. Special Dialysis Therapies

- Pediatric dialysis – differences & challenges
- Dialysis in pregnancy – monitoring & modifications
- Home dialysis – training patients & caregivers
- High-flux dialysis & hemodiafiltration (HDF) – concepts & advantages

8. Nutrition & Lifestyle in Dialysis

- Dietary restrictions in dialysis patients (protein, sodium, potassium, phosphate, fluid)
- Role of erythropoietin & iron in anemia management
- Lifestyle modifications: exercise, infection prevention, psychological support
- Counselling patients & families about compliance

9. Documentation & Record-Keeping

- Dialysis session records: pre, intra, and post-dialysis charts
- Machine maintenance logs & dialyzer reuse records
- Incident reporting system (complications, accidents, errors)
- Importance of patient confidentiality in dialysis documentation

10. Advances in Dialysis Technology



- Wearable dialysis devices
- Portable/home hemodialysis units
- Online hemodiafiltration (HDF)
- Artificial kidney & renal replacement research

PRACTICAL

➤ **Dialysis Machine Operation**

- Identification of dialysis machine components (blood pump, heparin pump, UF control, alarms)
- Demonstration & practice of **priming and rinsing dialysis machine**
- Calibration & checking conductivity, temperature, and alarm functions
- Preparing dialyzer & bloodlines for use

➤ **Water Treatment & Quality Testing**

- Demonstration of **water treatment system** (sand filter, carbon filter, RO, UV, storage tank)
- Hands-on training in checking:
 - Water hardness
 - Chlorine & chloramine levels
 - Conductivity & pH
- Documentation of water testing records as per dialysis guidelines

➤ **Patient Preparation for Dialysis**

- Recording pre-dialysis weight, BP, pulse, and temperature
- Preparing dialysis case sheet
- Cannulation site observation (AV fistula thrill/bruit, catheter dressing)
- Preparing patient psychologically for procedure

➤ **Hemodialysis Procedure (Hands-On Training)**

- Priming blood circuit & connecting dialyzer
- Safe cannulation techniques (observational and under supervision)
- Initiating dialysis: connecting patient to extracorporeal circuit
- Monitoring during dialysis:
 - Vital signs (every 30–60 mins)
 - Ultrafiltration control & fluid balance
 - Patient comfort and safety checks
- Termination of dialysis: returning blood, disconnection, and post-dialysis care

➤ **Peritoneal Dialysis (PD) Practice**

- Demonstration of CAPD bag exchange procedure
- Hands-on training in preparing PD fluid setup
- Observation of CCPD procedure in hospital
- Recording complications (peritonitis, leaks, catheter site infections)



➤ **Complication Management & Emergency Drills**

- Recognition & immediate response to:
 - Hypotension, cramps, nausea/vomiting
 - Air embolism, blood leak alarm, hemolysis
 - Arrhythmias, seizures, anaphylaxis
- Simulation of **cardiac arrest management** in dialysis unit (CPR, crash cart use)
- Emergency power failure drill during dialysis

➤ **Infection Control Practices**

- Hand hygiene & PPE demonstration
- Preparation of disinfectant solutions (hypochlorite, formalin, citric acid)
- Disinfection of dialysis machines & dialyzers (single-use vs reuse protocol)
- Biomedical waste segregation and disposal (needles, bloodlines, dialyzers)
- Hepatitis B/C & HIV patient isolation practices

➤ **Special Dialysis Procedures**

- Observation of pediatric dialysis sessions
- Demonstration of dialysis in ICU/critical care settings
- Training in **CRRT machine setup** (if available)
- Demonstration of online hemodiafiltration (HDF) procedure

➤ **Documentation & Record Keeping**

- Filling dialysis flow sheets (pre, intra, post dialysis data)
- Dialyzer reuse logbook maintenance
- Water quality logbook & infection control records
- Incident reporting of complications & equipment failure

➤ **Project Work & Case Presentation**

- Each student to prepare **two dialysis case studies** (with clinical details, dialysis prescription, complications, outcome)
- Presentation of one **complication management case** (e.g., hypotension or air embolism)
- Report on **infection control audit** in dialysis unit