

# Professional Master's Degree

## Update on Nephrology



## Professional Master's Degree Update on Nephrology

- » Modality: online
- » Duration: 12 months
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

Website: [www.techtitute.com/in/medicine/professional-master-degree/professional-master-degree-update-nephrology](http://www.techtitute.com/in/medicine/professional-master-degree/professional-master-degree-update-nephrology)

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# 01

# Introduction

Due to the increase in unhealthy lifestyles, the incidence of renal diseases is very high in many countries of the world, becoming a serious public health problem. This has led to the improvement of diagnostic procedures, surgical techniques and methods used for renal transplantation. For this reason, it is vital for the specialist to have an in-depth knowledge of the latest advances in the field in order to position himself at the medical forefront. Faced with this reality, TECH has developed this program, which will lead medical professionals to deepen in the improvement of treatments for Arterial Hypertension or ARF. All this, in a 100% online format, with didactic content, accessible from anywhere and at any time of the day.





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*This Professional Master's Degree will allow you to incorporate into your professional practice the most updated techniques for the approach to Chronic Kidney Disease”*

Over the years, Nephrology has undergone significant improvements in diagnostic methods, in the development of precise ultrasound devices that allow an assessment of renal structure and function. Likewise, the improvement of transplant surgical techniques has contributed to increase patient survival rates and improve the short-term quality of life of people with ARF. As a result, keeping up to date in this field is essential for the specialist who does not want to be left behind with respect to advances in this medical sector.

In this regard, TECH has designed this program, which will allow the physician to delve into the latest diagnostic and therapeutic advances in Nephrology. Throughout this educational period he will delve into the up to date methods for detecting and managing arterial hypertension, diabetic renal disease, renal replacement therapy, glomerular diseases and systemic diseases or advances in renal transplantation. For this purpose, numerous multimedia didactic materials, specialized readings and clinical case studies are available to present different scenarios that you may face in your daily practice.

This program will be presented in a 100% online format, which will give professionals the alternative of coordinating their daily activities with this updating process. Likewise, the combination with the Relearning method will allow you to optimize your update at your own pace, effectively consolidating the concepts addressed in this university proposal.

This **Professional Master's Degree in Update in Nephrology** contains the most complete and up-to-date scientific program on the market. The most important features include:

- Practical cases presented by specialists in Nephrology and Internal medicine
- The graphic, schematic, and practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional practice
- Practical exercises where self-assessment can be used to improve learning
- Its special emphasis on innovative methodologies
- Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- Content that is accessible from any fixed or portable device with an Internet connection



*Through this qualification, you will delve into the most advanced strategies when performing blood purification techniques"*

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*Get up to date thanks to this Professional Master's Degree in the treatment of the hydroelectrolytic alterations and poisonings that a patient may present”*

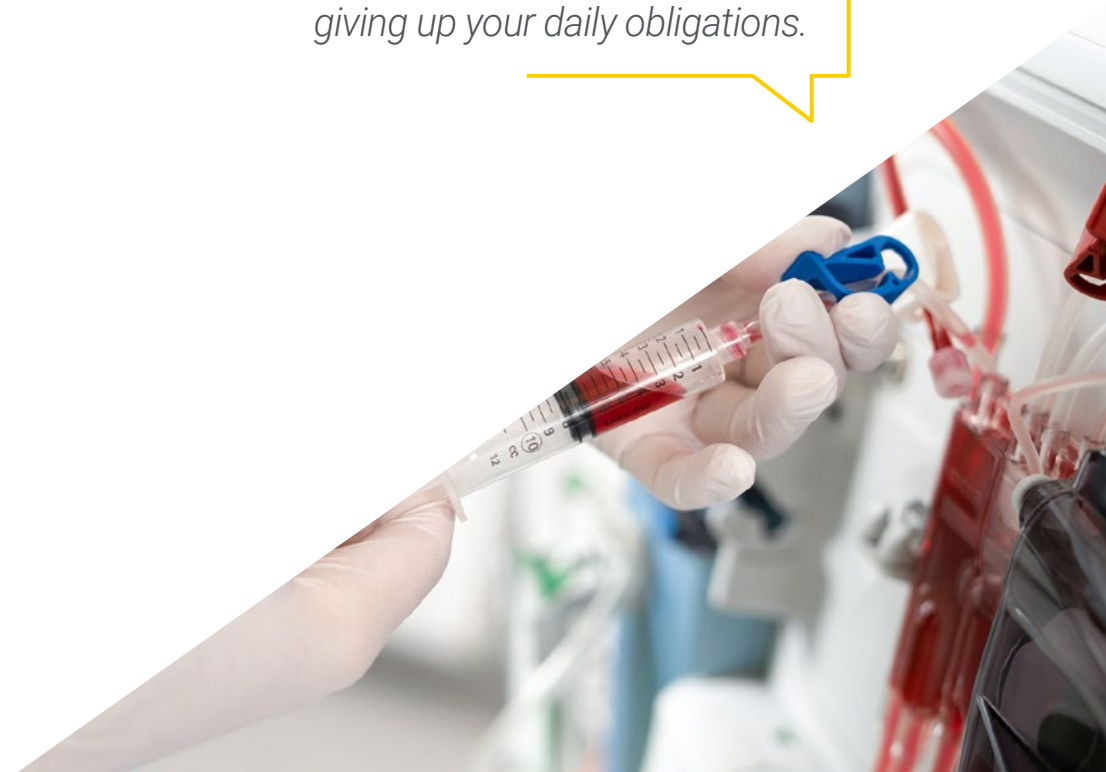
The program's teaching staff includes professionals from the field who contribute their work experience to this educational program, as well as renowned specialists from leading societies and prestigious universities.

The multimedia content, developed with the latest educational technology, will provide the professional with situated and contextual learning, i.e., a simulated environment that will provide immersive education programmed to learn in real situations.

This program is designed around Problem-Based Learning, whereby the professional must try to solve the different professional practice situations that arise during the academic year. For this purpose, the students will be assisted by an innovative interactive video system created by renowned and experienced experts.

*Learn about the latest protocols for the management of patients with Acute Renal Failure through this degree.*

*Update yourself under a 100% online format and without giving up your daily obligations.*



# 02 Objectives

The aim of this program is to provide the physician with the latest scientific evidence and the most up to date tools in the nephrological field. Therefore, you will delve into the most accurate diagnostic methods and the most advanced treatments applied to different renal diseases. This will allow you to focus on prevention and early management of the conditions through the use of the most recent studies in research and technology applied to this area.





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*Transfer to your daily practice  
the most up to date knowledge  
in Onconeurology”*



## General Objectives

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- Care for patients with chronic kidney disease and its most frequent complications
- Care for patients with acute renal failure and its complications, as well as to understand the objective of initiating renal replacement therapy, its indications and management
- Have an overview of Nephrology as a specialty with its different branches of knowledge and a global approach to the patient
- Delve into the branches that are emerging within the specialty such as diagnostic and interventional nephrology, onconeurology, or cardioneurology





## Specific Objectives

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### Module 1. Chronic Kidney Disease (CKD)

- ♦ Delve into CKD as a systemic disease, as well as its particularities
- ♦ Delve into the most common complications in patients with CKD
- ♦ Describe the particularities of patients with CKD in different special clinical situations (indication of anticoagulation, dyslipidemia, cardiovascular risk)

### Module 2. Arterial Hypertension (AH) and Diabetic Kidney Disease

- ♦ Delve in the novelties in the diagnosis and study of Arterial Hypertension
- ♦ Delve in the indication for the study of Secondary Arterial Hypertension
- ♦ Describe Diabetic Renal Disease as one of the most frequent causes of CKD
- ♦ Update knowledge on the management and indication of new nephroprotective drugs

### Module 3. Cardiorenal Medicine

- ♦ Expand the knowledge and study of cardiorenal syndrome
- ♦ Delve into the application of ultrasound and biomarkers for the study of patients with cardiorenal syndrome
- ♦ Improve the management of patients with decompensated heart failure, optimization of diuretics
- ♦ Detail the usefulness and criteria for renal replacement therapy in cardiorenal patients

### Module 4. Glomerular Diseases and Systemic Diseases

- ♦ Delve into the main glomerular diseases, their treatment and management
- ♦ Delve into how systemic diseases affect the kidney
- ♦ Describe how monoclonal component producing diseases affect the kidney
- ♦ Detail hemolytic uremic syndrome, its differential diagnosis and treatment according to the etiology

### Module 5. Acute Renal Failure (ARF)

- ♦ Be up to date in the diagnosis of Acute Renal Failure
- ♦ Describe the prognostic urinary biomarkers
- ♦ Delve into the Acute Kidney Injury as a syndrome, understanding its approach
- ♦ Establish the different renal replacement techniques in the patient with Acute Renal Failure, delving into their advantages and disadvantages
- ♦ Delve into the particularities of nutrition management and antibiotic dosage in patients with acute kidney injury

### Module 6. Diagnostic and Interventional Nephrology

- ♦ Delve into the the growing applications of Diagnostic and Interventional Nephrology
- ♦ Delve into the indications and contraindications of renal biopsy
- ♦ Describe the indications and contraindications of temporary and/or tunneled catheter placement for hemodialysis
- ♦ Delve into the the application of structural ultrasound and renal Doppler

### Module 7. Renal Replacement Therapy

- ◆ Detail the best renal replacement technique for each patient, as well as the choice of the best vascular access in each case
- ◆ Delve into the the indications to start a hemodialysis program
- ◆ Delve into the indications for initiating a home dialysis program in the form of home hemodialysis or peritoneal dialysis
- ◆ Analyze the contraindications to continue a hemodialysis program and understand the need for collaboration with a palliative program to respond to patients who withdraw from a dialysis program

### Module 8. Onconeurology and Kidney-Liver

- ◆ Gain an in-depth knowledge of Onconeurology as a subspecialty of Nephrology and its usefulness
- ◆ Identify those patients at risk of developing renal failure during oncological treatment, as well as its approach and treatment
- ◆ Describe the close relationship between the kidney and the liver
- ◆ Delve into the diagnostic criteria of hepatorenal syndrome and its management

### Module 9. Hydroelectrolytic Alterations and Poisonings

- ◆ Detect the different hydroelectrolytic alterations most frequently consulted in Nephrology
- ◆ signals the novelties in the treatment and diagnosis of metabolic acidosis and metabolic alkalosis
- ◆ Delve into the indication for renal replacement therapy in the management of lithium, metformin and glycolic poisoning
- ◆ Delve into the the diagnosis between distal tubular acidosis and type IV tubular acidosis



### Module 10. Renal Transplant and Other Blood Purification Techniques

- ♦ Delve into the indications and contraindications for renal transplantation
- ♦ Delve into the immunosuppression guidelines in the renal transplant patient, as well as its complications
- ♦ Describe the management of infections in the renal transplanted patient, as well as the management of acute rejection
- ♦ Expand the study of the different blood cleansing techniques such as plasmapheresis, adsorption techniques

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*With this program, you will inquire into the most advanced treatments for Glomerular and Systemic Diseases”*

# 03 Skills

This qualification will provide professionals with the bases to develop necessary attitudes in the nephrology field. In this regard, by completing this Professional Master's Degree, physicians will acquire up to date skills in the diagnosis, treatment and management of renal diseases. All this, enjoying the most advanced educational methodology of the current educational panorama.



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*Position yourself as a leading-edge physician through the latest trends in Renal Replacement Therapy”*



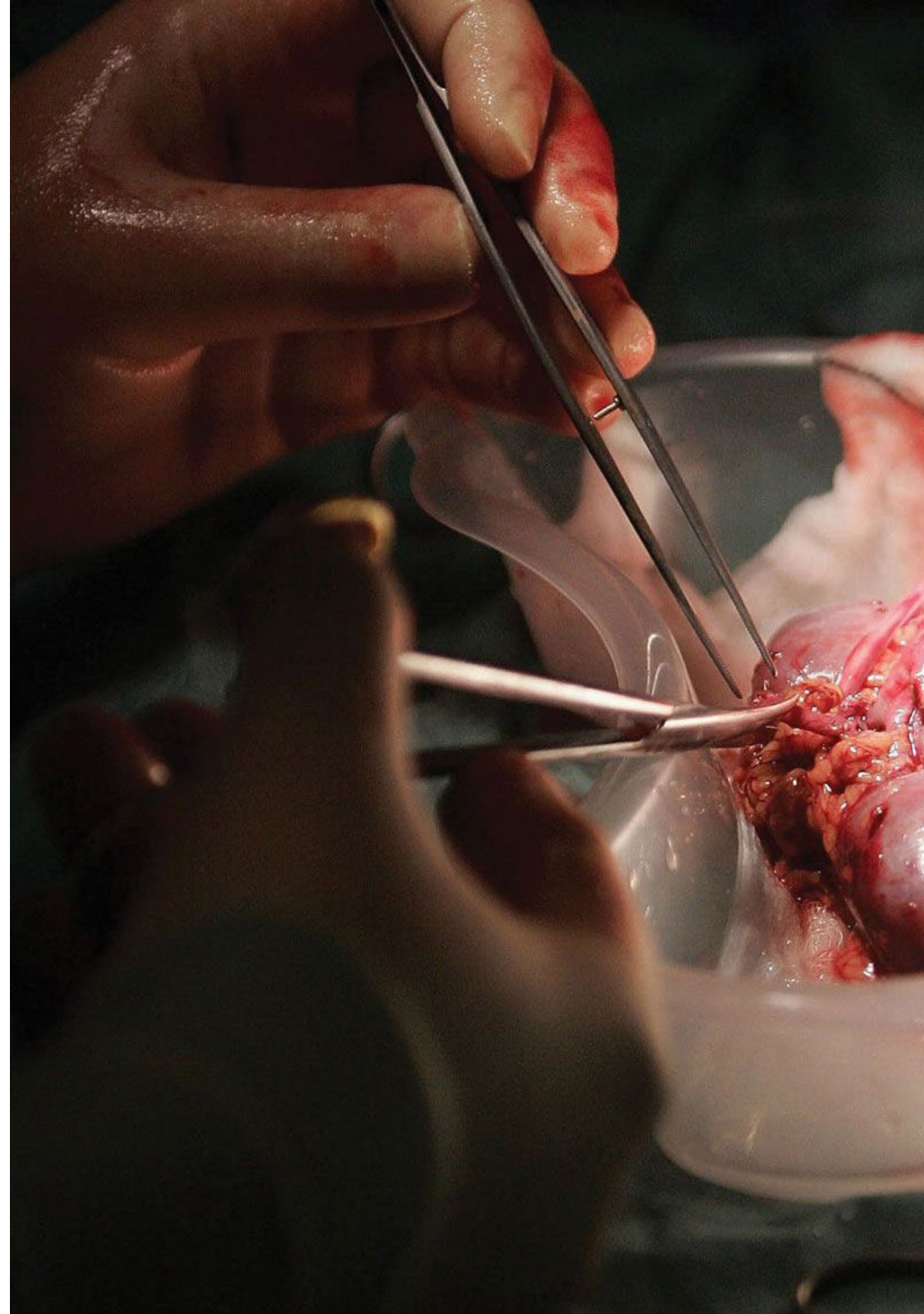
## General Skills

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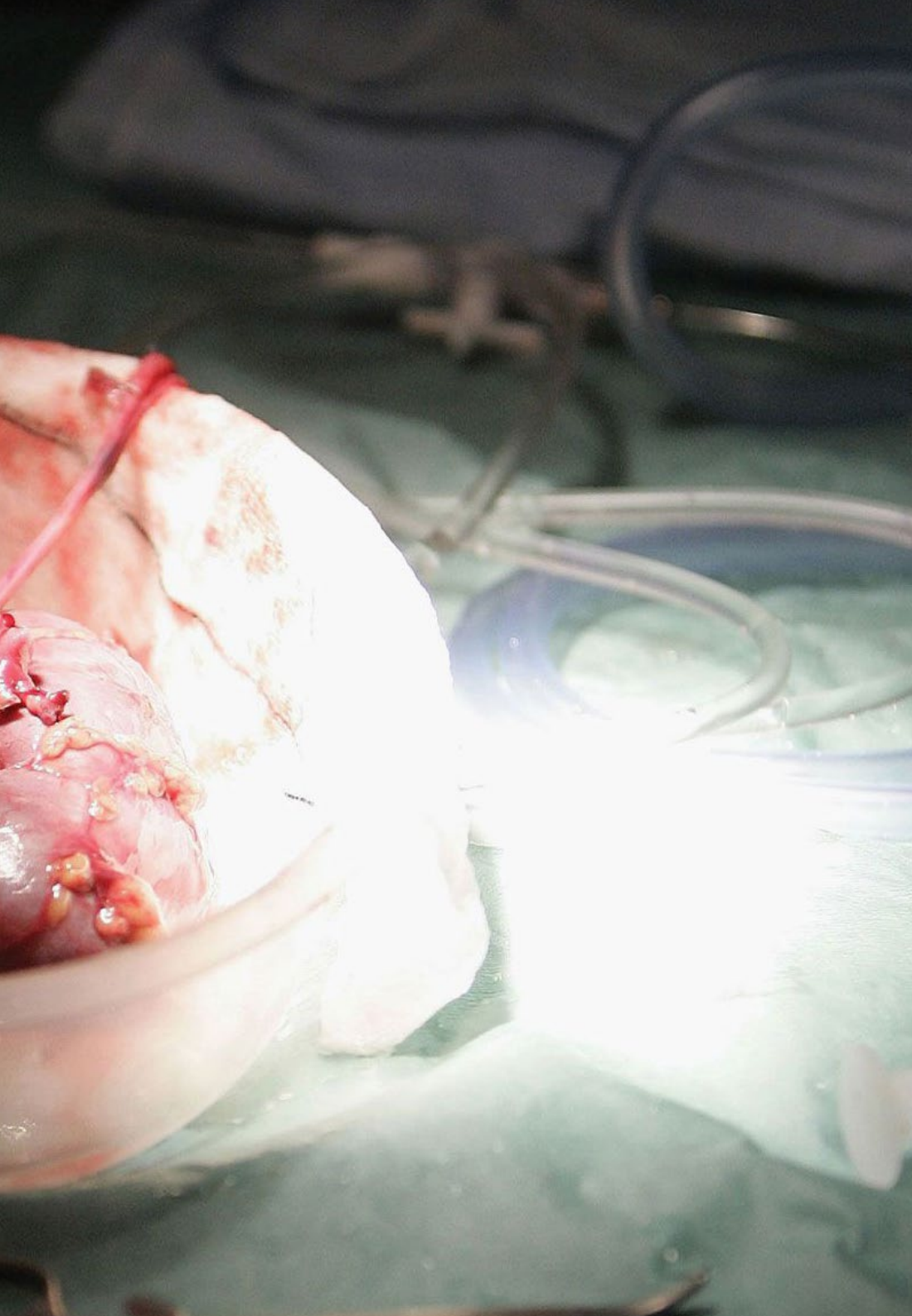
- ◆ Comprehensive management of chronic renal disease
- ◆ Manage acute renal failure and renal replacement therapy
- ◆ Have a broad knowledge of the global approach in Nephrology
- ◆ Constantly update knowledge and adapt it to the work environment

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*In only 12 months update and enrich your skills in Diagnostic and Interventional Nephrology”*







## Specific Skills

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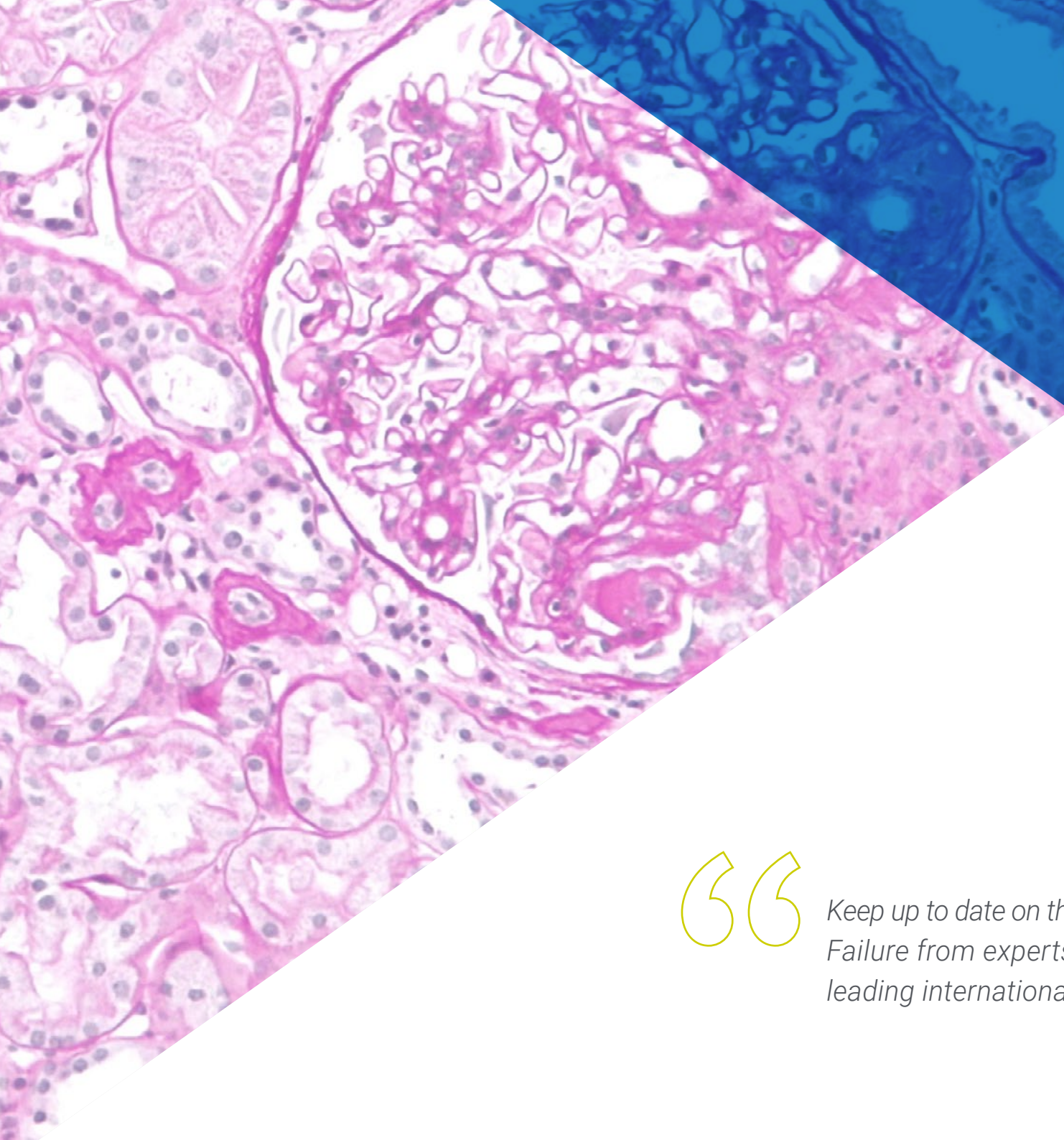
- ◆ Manage hypertensive emergencies
- ◆ Improve competencies on percutaneous peritoneal dialysis catheter placement methods
- ◆ Master blood cleansing techniques
- ◆ Update techniques in the diagnosis and treatment of metabolic acidosis and alkalosis
- ◆ Explore onconephrology and its application in the medical field
- ◆ Master the indications to start hemodialysis

# 04

# Course Management

In order to preserve the excellent educational quality that characterizes TECH degrees, this Professional Master's Degree has a teaching staff made up of leading specialists in the field of Nephrology. These professionals, who actively perform their functions in first level hospitals, have high skills in the management of renal conditions, surgery and dialysis. Therefore, the knowledge obtained by the student will be in tune with the latest advances in this area.





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*Keep up to date on the evolution of Acute Renal Failure from experts in the field who work in leading international hospitals"*

## Management



### Dr. Galcerán, Josep María

- ◆ Nephrologist at the Sant Jordi Clinic in Sant Andreu
- ◆ Nephrology Del Mar Hospital, Barcelona
- ◆ Expert in Clinical Ultrasound at the Francisco de Vitoria University
- ◆ Master's Degree in Infectious Diseases and Antimicrobial Treatment from the CEU Cardenal Herrera University
- ◆ Degree in Medicine from the Autonomous University of Barcelona



### Dr. Ribas Closa, Andrés

- ◆ Head of Nephrology Service at Fundació Althaia in Manresa
- ◆ Head of Nephrology Service at the Hospital de Palamós
- ◆ Professor of Nephrology at the International University of Catalonia
- ◆ Former President of the Catalan Societies of Nephrology and Arterial Hypertension
- ◆ Specialization in Nephrology by the Hospital de Bellvitge
- ◆ Postgraduate degree in Basic Nephrology from the University of Minnesota
- ◆ Degree in Medicine and Surgery from the University of Barcelona
- ◆ Member of: Spanish Society of Nephrology and Arterial Hypertension



## Professors

### Dr. Galcerán, Isabel

- ◆ Specialist in Nephrology at Del Mar Hospital of Barcelona
- ◆ Bachelor in Medicine and Surgery from the Autonomous University of Barcelona

### Dr. Outón, Sara

- ◆ Nephrologist at Consorci Sanitari Alt Penedès-Garraf
- ◆ Pediatric Nephrologist in the University of California
- ◆ Degree in Medicine from the University of Santiago de Compostela

### Dr. Pascual Sánchez, Sergio

- ◆ Specialized in Nephrology at Consorci Sanitari Alt Penedès-Garraf
- ◆ Psychiatric Monitor at CPB (Serveis Salut Mental)
- ◆ Master's Degree in Neurobiology and Behavior from the Instituto Superior de Estudios Psicológicos (Higher Institute of Psychological Studies)
- ◆ Degree in Medicine from the Autonomous University of Barcelona
- ◆ Degree in Psychology from the Autonomous University of Barcelona

# 05

## Structure and Content

The syllabus that makes up this program covers a wide range of crucial topics related to renal conditions. Therefore, students will be up to date with the latest methods of diagnosis and treatment of Chronic Kidney Disease, Arterial Hypertension or Acute Renal Failure. In addition, the contents will be available to the physician in multimedia formats such as interactive summaries and simulations of real cases. Likewise, the student will enjoy them 100% online and without leaving home.





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*The Relearning method presented by this qualification will allow you to update your knowledge at your own pace and without time constraints"*

## Module 1. Chronic Kidney Disease (CKD)

- 1.1. Epidemiology and diagnosis of CKD
  - 1.1.1. Epidemiology of CKD in our setting
  - 1.1.2. Global Burden of Disease
  - 1.1.3. Diagnosis. KDIGO 2021-2022 Guidelines
  - 1.1.4. Chronic Kidney Disease vs. Renal Aging
- 1.2. Risk Factors
  - 1.2.1. Non-modifiable risk factors
  - 1.2.2. Modifiable risk factors
  - 1.2.3. Sarcopenia and fragility
- 1.3. Anemia and Chronic Kidney Disease
  - 1.3.1. Definition and management of Anemia in Chronic Kidney Disease Patients
  - 1.3.2. New molecules for the treatment of anemia in CKD patients
  - 1.3.3. Iron Metabolism in Chronic Kidney Disease
- 1.4. Bone mineral metabolism in CKD
  - 1.4.1. Mineral metabolism alterations: Calcium, phosphorus, Klotho, PTH, FGF-23 and Vitamin D
  - 1.4.2. Primary Hyperparathyroidism vs. Secondary hyperparathyroidism in CKD patients
  - 1.4.3. New molecules for the treatment of secondary hyperparathyroidism
  - 1.4.4. Osteoporosis in CKD
- 1.5. Cardiovascular alterations and Inflammation in CKD
  - 1.5.1. Cardiac remodeling in CKD
  - 1.5.2. Vascular calcification in CKD
  - 1.5.3. Cardiovascular study of the patient with CKD
- 1.6. Hyperkalemia in Chronic Kidney Disease
  - 1.6.1. Management of the patient with hyperkalemia
  - 1.6.2. New drugs for the treatment of hyperkalemia
- 1.7. Nutrition in Chronic Kidney Disease
  - 1.7.1. Health education in the patient with CKD
  - 1.7.2. Malnutrition in Chronic Kidney Disease
  - 1.7.3. Nutritional Supplements

- 1.8. Anticoagulation in the CKD Patient
  - 1.8.1. Indications in Atrial Fibrillation
  - 1.8.2. Antivitamin K in CKD
  - 1.8.3. New oral anticoagulants in CKD
- 1.9. Dyslipidemia and Cardiovascular Risk in CKD
  - 1.9.1. Indication for treatment with lipid-lowering drugs in CKD
  - 1.9.2. Global cardiovascular risk in patients with CKD
- 1.10. Immunological response in CKD
  - 1.10.1. COVID19 infection and vaccines
  - 1.10.2. Hepatitis B and C Virus Prophylaxis

## Module 2. Arterial Hypertension (AH) and Diabetic Kidney Disease

- 2.1. Pathogenesis of Arterial Hypertension and cardiovascular risk
  - 2.1.1. Renin angiotensin system
  - 2.1.2. Cardiac remodeling in patients with hypertension
- 2.2. New developments in the diagnosis of AH
  - 2.2.1. ACC/AHA, ESC/ESH Guidelines
  - 2.2.2. Diagnostic Procedures in Arterial Hypertension
  - 2.2.3. Usefulness of the ABPM and the AMPA
- 2.3. Arterial Hypertension in Special Situations
  - 2.3.1. Resistant and refractory AH
  - 2.3.2. Spurious AH
  - 2.3.3. AH in Chronic Kidney Disease
- 2.4. Secondary Arterial Hypertension
  - 2.4.1. When is the study indicated? Etiologies
  - 2.4.2. Complementary examinations in secondary AH
  - 2.4.3. Secondary hyperaldosteronism Diagnosis
  - 2.4.4. Treatment in secondary hyperaldosteronism Updates
- 2.5. Hypertensive Emergency and Urgency
  - 2.5.1. Diagnosis of Hypertensive Emergency
  - 2.5.2. Management of hypertensive emergency/hypertensive emergency



- 2.6. Therapeutic developments in AH
  - 2.6.1. Renal Denervation in patients with AH refractory to treatment
  - 2.6.2. New aldosterone receptor antagonists
  - 2.6.3. PCSK9 Inhibitors
- 2.7. Diabetic Kidney Disease
  - 2.7.1. Definition. Histological Classification
  - 2.7.2. New developments in the Pathophysiology of Diabetic Kidney Disease
- 2.8. New Treatments in Diabetic Kidney Disease
  - 2.8.1. Inhibitors of sodium-glucose cotransporter type 2 (SGLT-2) Utility and practical aspects Diabetic and non-diabetic patients
  - 2.8.2. GLP-1-Agonists:
- 2.9. Carotid Ultrasound
  - 2.9.1. Intima-media thickness
  - 2.9.2. Atheroma plaques
  - 2.9.3. Cardiovascular risk according to carotid ultrasound findings
- 2.10. Renovascular Arterial Hypertension
  - 2.10.1. Renal Artery Stenosis
  - 2.10.2. Renal Doppler Indications
  - 2.10.3. Arteriography and angioplasty indications

### Module 3. Cardiorenal Medicine

- 3.1. Pathophysiology of Cardiorenal Syndrome
  - 3.1.1. Physiological interactions between the heart and the kidney
  - 3.1.2. Risk factors in heart-kidney interaction
  - 3.1.3. Congestive phenotypes in the cardiorenal patient
- 3.2. Vexus Protocol in the Cardiorenal Patient
  - 3.2.1. Stratification of systemic congestion
  - 3.2.2. Portal venous Doppler
  - 3.2.3. Suprahepatic venous Doppler
  - 3.2.4. Renal venous Doppler
- 3.3. Pleuropulmonary Ultrasound in Cardiorenal Patients
  - 3.3.1. Normal Pulmonary Ultrasound A lines pattern
  - 3.3.2. Pleural sliding and pleural effusion
  - 3.3.3. Blue Protocol for dyspnea study
- 3.4. Basic Echocardiography in the Cardiorenal Patient
  - 3.4.1. Basic echocardiographic planes
  - 3.4.2. Assessment of valvulopathies
  - 3.4.3. Ventricular function. TAPSE, MAPSE
  - 3.4.4. Diastolic alterations in the chronic renal patient
- 3.5. Biomarkers in the Cardiorenal Patient
  - 3.5.1. Usefulness of CA125. Usefulness of Nt-ProBNP
  - 3.5.2. Management of biomarkers in the cardiorenal patient
  - 3.5.3. Resistance to diuretics Mechanisms. Treatment
- 3.6. Bioimpedance in Cardiorenal Medicine
  - 3.6.1. Usefulness of Bioimpedance
  - 3.6.2. Limitations
  - 3.6.3. Useful parameters in the cardiorenal patient
- 3.7. Prognostic drugs in Heart Failure and CKD
  - 3.7.1. ARA-II, ACE INHIBITORS
  - 3.7.2. ARNI
  - 3.7.3. Uses of SGLT-2 in cardiorenal patient
- 3.8. Diuretics in the Cardiorenal Patient
  - 3.8.1. Utility of loop diuretics
  - 3.8.2. Utility of acetazolamide, ADVOR study
  - 3.8.3. Sequential blockade of the nephron
  - 3.8.4. Resistance to diuretics
- 3.9. Management of Acute Heart Failure in Patients with CKD
  - 3.9.1. Diuretic dosage
  - 3.9.2. Acid-base balance disturbances. Alkalosis due to diuretic
  - 3.9.3. Furosemide Test
  - 3.9.4. Utility of inotropes
- 3.10. Renal Replacement Therapy in the Management of the Cardiorenal Patient
  - 3.10.1. Peritoneal Dialysis Utility in the patient with refractory heart failure
  - 3.10.2. Other renal replacement techniques Continuous renal replacement techniques, SCuF, intermittent hemodialysis

## Module 4. Glomerular Diseases and Systemic Diseases

- 4.1. Idiopathic Nephrotic Syndrome in Adults
  - 4.1.1. Definition and Classification
  - 4.1.2. Minimal change disease. Etiology, Diagnosis and Treatment
  - 4.1.3. Focal and segmental glomerulosclerosis. Etiology, Diagnosis and Treatment
- 4.2. Membranous Nephropathy
  - 4.2.1. Etiology, Definition and Classification
  - 4.2.2. New developments in diagnosis. New serological markers
  - 4.2.3. Treatment. Current clinical trials
  - 4.2.4. New molecules in treatment
- 4.3. ANCA vasculitis
  - 4.3.1. Classification of ANCA vasculitides and diagnosis. Urine soluble CD163
  - 4.3.2. Diagnosis of ANCA vasculitis
  - 4.3.3. New developments in the treatment of ANCA vasculitis. Avacopan
  - 4.3.4. Plasmapheresis. PEXIVAS study
- 4.4. IgA Nephropathy
  - 4.4.1. Diagnosis
  - 4.4.2. Treatment. KDIGO Guidelines
  - 4.4.3. New developments in treatment. Nefecon
- 4.5. Lupus and Kidney
  - 4.5.1. Lupus nephritis. Indications for renal biopsy
  - 4.5.2. Complement pathway in lupus nephritis
  - 4.5.3. Treatment in lupus nephritis
- 4.6. Kidney and Monoclonal Gammopathies
  - 4.6.1. Monoclonal Gammopathies of uncertain significance
  - 4.6.2. Monoclonal Gammopathies of Renal Significance
  - 4.6.3. Enf. Waldstrom and hyperviscosity sde
- 4.7. Myeloma kidney
  - 4.7.1. Diagnosis and indications for renal biopsy
  - 4.7.2. Renal Replacement Therapy
  - 4.7.3. Elimination of light chains by depuration techniques
  - 4.7.4. Prognosis of Disease

- 4.8. Hemolytic Uremic Syndrome
  - 4.8.1. Differential Diagnosis
  - 4.8.2. Usefulness of plasmapheresis in HUS/PTT
  - 4.8.3. Eculizumab. Indications
- 4.9. Renal amyloidosis
  - 4.9.1. Types of amyloidosis
  - 4.9.2. Etiopathogenesis and Histology
  - 4.9.3. Diagnosis
  - 4.9.4. Treatment. IL-6 Inhibitors
- 4.10. Recurrence of Glomerular Diseases in Post Kidney Transplantation
  - 4.10.1. Focal and segmental glomerulosclerosis
  - 4.10.2. IgA Nephropathy

## Module 5. Acute Renal Failure (ARF)

- 5.1. New Diagnostics and Classification
  - 5.1.1. Acute Renal Insufficiency Markers KIM-1, TIMP-2
  - 5.1.2. Classification of ARF Nomenclature
  - 5.1.3. Inflammation in ARF Kidney-Heart, Kidney-Lung Interaction
- 5.2. Diagnostic and Therapeutic Protocol of ARF
  - 5.2.1. Water balance and ARF
  - 5.2.2. Dyselectrolythemia in patients with ARF. Hyperkalemia in the critically ill patient
  - 5.2.3. Utility of diuretics in ARF
  - 5.2.4. Utility of albumin as a colloid in ARF
- 5.3. Acute Renal Failure and Renal Replacement Therapy
  - 5.3.1. Early vs. late initiation of renal replacement therapy
  - 5.3.2. Indications for renal replacement therapy
- 5.4. Continuous Renal Replacement Techniques (CRRT)
  - 5.4.1. Indication Machines
  - 5.4.2. Guideline, effluent dose
  - 5.4.3. Utility of replacement liquid Prefilter. Postfilter
  - 5.4.4. TCRR circuit anticoagulation

- 5.5. Hybrid Renal Replacement Techniques
  - 5.5.1. Definition
  - 5.5.2. Uses. Evidence of its usefulness in the critically ill patient.evidence of Coagulopathy in Critical Patients
  - 5.5.3. Advantages and Disadvantages of the Hybrid Techniques
- 5.6. Intermittent Hemodialysis in the Critically Ill Patient
  - 5.6.1. Intermittent Hemodialysis in the Critically Ill Patient
  - 5.6.2. Dialysis Dosis regimen
  - 5.6.3. Ultrafiltration in the hemodynamically unstable patient
- 5.7. Respiratory Dialysis
  - 5.7.1. Pathophysiology of ARDS
  - 5.7.2. Protective mechanical ventilation
  - 5.7.3. Usefulness of ECCO2R membranes
- 5.8. Kidney and Sepsis
  - 5.8.1. New developments in Sepsis and Septic Shock
  - 5.8.2. Principles of antimicrobial prescribing in ARF
  - 5.8.3. Renal replacement therapy in the patient with septic shock
- 5.9. Nutrition in the Acute Renal Failure Patient
  - 5.9.1. Protein-caloric malnutrition
  - 5.9.2. Hypercatabolism in the Critically Ill Patient
- 5.10. Antibiotics in the Critically Ill Patient undergoing Renal Replacement Therapy
  - 5.10.1. Determinants of antibiotic distribution (Vd, proteins)
  - 5.10.2. Adjustment of the main drugs according to pharmacokinetics/ pharmacodynamics
  - 5.10.3. Adjustment of drugs according to the dialysis technique employed
- 6.3. Ultrasound of Renal Masses
  - 6.3.1. Simple Renal Cysts
  - 6.3.2. Polycystic Kidney Disease
  - 6.3.3. Angiomyolipomas
- 6.4. Vascular Ultrasound
  - 6.4.1. Vascular mapping for vascular access
  - 6.4.2. Vascular Ultrasound in Venous Access for Hemodialysis
- 6.5. Percutaneous Renal Biopsy
  - 6.5.1. Indications
  - 6.5.2. Techniques Relative and Absolute Contraindications
  - 6.5.3. Complications
  - 6.5.4. Transjugular Renal Biopsy. Indications and experience
- 6.6. Catheter Placement for temporary Hemodialysis
  - 6.6.1. Indications for temporary catheter
  - 6.6.2. Types of temporary catheters for hemodialysis
  - 6.6.3. Seldinger technique Technique Complications
- 6.7. Tunneled hemodialysis catheter
  - 6.7.1. Hemodialysis catheter tunneling technique
  - 6.7.2. Technique Complications
  - 6.7.3. Performance and duration of vascular access
- 6.8. Dialysis Catheter-Related Sepsis
  - 6.8.1. Removal of tunneled dialysis catheter Indications
  - 6.8.2. Tunneled Catheter Removal Technique
  - 6.8.3. Infections by biofilm-producing germs
- 6.9. New Imaging Techniques in Nephrology
  - 6.9.1. Ultrasound with contrast
  - 6.9.2. Utility of nuclear magnetic resonance in Nephrology
- 6.10. Percutaneous Peritoneal Catheter Implantation
  - 6.10.1. Implantation Techniques
  - 6.10.2. Post implantation care
  - 6.10.3. Complications

## Module 6. Diagnostic and Interventional Nephrology

- 6.1. Renal Doppler Ultrasound and Ultrasonography
  - 6.1.1. Renal morphological characteristics by ultrasound
  - 6.1.2. Resistance indices. Alterations and usefulness
  - 6.1.3. Renal artery Doppler ultrasound
- 6.2. Doppler Ultrasound and Complications of Renal Transplantation
  - 6.2.1. Venous Thrombosis
  - 6.2.2. Arterio-Venous Fistula
  - 6.2.3. Lymphocele/urinoma

## Module 7. Renal Replacement Therapy

- 7.1. Choice of Technique
  - 7.1.1. Renal replacement Therapy indications
  - 7.1.2. Contraindications of Renal Replacement Therapy
  - 7.1.3. Choice of Treatment
- 7.2. Hemodialysis Vascular Access
  - 7.2.1. Arterio-Venous Fistula
  - 7.2.2. Prosthesis
  - 7.2.3. Central venous Catheter
  - 7.2.4. Choice of vascular access
- 7.3. Hemodialysis
  - 7.3.1. High-Flow Hemodialysis
  - 7.3.2. Online Hemodialysis Indication, technique and adequacy of the same
  - 7.3.3. Extended hemodialysis and incremental hemodialysis
- 7.4. Peritoneal Dialysis
  - 7.4.1. Techniques Indications
  - 7.4.2. Contraindications of Peritoneal Dialysis. Complications
  - 7.4.3. Choice of Technique: APD or CAPD
- 7.5. Complications in Hemodialysis
  - 7.5.1. Hypotension
  - 7.5.2. Arrhythmias in Hemodialysis Patients
  - 7.5.3. Allergy to the dialyzer
- 7.6. Complications in Peritoneal Dialysis
  - 7.6.1. PD catheter migration
  - 7.6.2. Peritonitis in the PD patient
- 7.7. Home Hemodialysis
  - 7.7.1. Indications
  - 7.7.2. Technique and contraindications
  - 7.7.3. Origin of home hemodialysis. Future
- 7.8. Fragility in the Hemodialysis Patient
  - 7.8.1. Sarcopenia
  - 7.8.2. Undernourishment in the Hemodialysis Patient
  - 7.8.3. Physical Exercise and Hemodialysis

- 7.9. Anticoagulation in Hemodialysis
  - 7.9.1. Antivitamin K in Hemodialysis
  - 7.9.2. Contraindications
  - 7.9.3. Controversies in the Hemodialysis Patient
  - 7.9.4. NACOS
- 7.10. Withdrawal from the Hemodialysis Program
  - 7.10.1. Indications
  - 7.10.2. Palliative Care in Nephrology

## Module 8. Onconeurology and Kidney-Liver

- 8.1. Kidney-Cancer Connection
  - 8.1.1. Chronic kidney disease and cancer: risk factors
  - 8.1.2. Renal damage after contrast in the oncologic patient
- 8.2. Acute Renal Failure in the Oncologic Patient
  - 8.2.1. Diagnosis
  - 8.2.2. Indications for renal biopsy
  - 8.2.3. Thrombotic Microangiopathy in the oncologic patient
  - 8.2.4. Tumor Lysis Syndrome
- 8.3. Check-Point inhibitors
  - 8.3.1. Therapeutic arsenal
  - 8.3.2. Targets of action
  - 8.3.3. Acute Renal Failure
- 8.4. Cancer and Renal Transplantation
  - 8.4.1. Incidence
  - 8.4.2. Diagnosis
  - 8.4.3. Treatment
- 8.5. Liver-Kidney Interaction
  - 8.5.1. Pathophysiology of the hepatorenal syndrome
- 8.6. Management of Hepatorenal Syndrome
  - 8.6.1. Diagnostic Criteria
  - 8.6.2. Prophylaxis and general measures
  - 8.6.3. Vasoconstrictors and albumin
- 8.7. Renal Dysfunction After Liver Transplantation

- 8.7.1. Acute renal injury after liver transplantation
- 8.7.2. Effects of immunosuppression
- 8.8. Extracorporeal Liver Support Devices
  - 8.8.1. MARS Systems
  - 8.8.2. Hemofiltration and Hemodiafiltration
  - 8.8.3. Single-pass dialysis
- 8.9. Chronic Kidney Disease and Cirrhosis
  - 8.9.1. Hepatitis virus infection in chronic kidney disease
  - 8.9.2. NASH and metabolic syndrome
  - 8.9.3. Indications for double Liver and Kidney transplantation
- 8.10. Glomerulopathies and Cirrhosis
  - 8.10.1. Secondary IgA glomerulopathy
  - 8.10.2. Other glomerulopathies in the cirrhotic patient

## Module 9. Hydroelectrolytic Alterations and Poisonings

- 9.1. Metformin poisoning
  - 9.1.1. Pathophysiology
  - 9.1.2. Risk Factors and Classification
  - 9.1.3. Treatment
- 9.2. Ethylene glycol poisoning
  - 9.2.1. Diagnosis
  - 9.2.2. Treatment
- 9.3. Lithium Poisoning
  - 9.3.1. Diagnosis and Clinic
  - 9.3.2. Treatment Indications
  - 9.3.3. Renal replacement treatment indications
- 9.4. Lactic Acidosis
  - 9.4.1. Generation of lactic acid
  - 9.4.2. Differential Diagnosis of Lactic Acidosis
  - 9.4.3. Indication of treatment with bicarbonate
- 9.5. Renal Tubular Acidosis

- 9.5.1. Renal Tubular Distal Acidosis
- 9.5.2. Renal Tubular Acidosis Type IV
- 9.6. GAP Anion
  - 9.6.1. Gap anion calculation
  - 9.6.2. Anion GAP and clinical utility
  - 9.6.3. Urinary GAP anion
- 9.7. Hyperkalemia
  - 9.7.1. Acute hyperkalemia, causes and diagnosis
  - 9.7.2. Treatment of Acute Hyperkalemia
  - 9.7.3. Renal replacement therapy in acute hyperkalemia
- 9.8. Hyponatremia
  - 9.8.1. Estimation of extracellular volume in hyponatremia
  - 9.8.2. Treatment algorithms in hyponatremia
  - 9.8.3. Usefulness of urinary study
- 9.9. Metabolic Alkalosis
  - 9.9.1. Differential Diagnosis
  - 9.9.2. Treatment of metabolic alkalosis
  - 9.9.3. Role of dialysis in metabolic alkalosis
- 9.10. Magnesium disorders
  - 9.10.1. Hypomagnesemia
  - 9.10.2. Hypomagnesemia

## Module 10. Renal Transplant and Other Blood cleansing techniques

- 10.1. Indications for Renal Transplantation
  - 10.1.1. Indication and contraindications of renal transplantation
  - 10.1.2. Pre-renal transplant immunological study
- 10.2. Immunosuppression in Renal Transplantation
  - 10.2.1. Immunosuppression regimens in renal transplantation
  - 10.2.2. Induction regimens in renal transplantation
  - 10.2.3. Complications related to immunosuppression
  - 10.2.4. Imlyfidase
- 10.3. Complications of Renal Post-transplantation

- 10.3.1. Surgical complications
- 10.3.2. Cardiovascular Complications
- 10.4. Infection in the Renal Transplant Patient
  - 10.4.1. Infections in the immediate post-transplant period
  - 10.4.2. Infections in the Renal Transplant Patient
  - 10.4.3. Opportunistic infections: CMV, BKCMV
- 10.5. Acute Rejection in Renal Transplant Patients
  - 10.5.1. Indications for renal biopsy
  - 10.5.2. New Treatments
- 10.6. Plasmapheresis Non Renal Indications
  - 10.6.1. Plasmapheresis in hematologic diseases
  - 10.6.2. Plasmapheresis in Septic Shock
  - 10.6.3. Plasmapheresis in systemic autoimmune diseases
- 10.7. Molecular Adsorption Techniques
  - 10.7.1. Endotoxin adsorption filters
  - 10.7.2. Utility and clinical evidence
- 10.8. Extracorporeal oxygenation membranes
  - 10.8.1. Membranes for lung support
  - 10.8.2. Membranes for Cardiac support
- 10.9. Prometheus System
  - 10.9.1. Prometheus system utility. EC HELIOS
  - 10.9.2. Comparison between Prometheus and MARS System
- 10.10. PFAD System (Plasma Filtration-Adsorption-Dialysis)
  - 10.10.1. New Perspectives
  - 10.10.2. Potential usefulness in the clinic





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*Take this Professional Master's Degree and obtain the most innovative knowledge on different fields of Nephrology”*

06

# Methodology

This academic program offers students a different way of learning. Our methodology uses a cyclical learning approach: **Relearning.**

This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.





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*Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"*

## At TECH we use the Case Method

What should a professional do in a given situation? Throughout the program, students will face multiple simulated clinical cases, based on real patients, in which they will have to do research, establish hypotheses, and ultimately resolve the situation. There is an abundance of scientific evidence on the effectiveness of the method. Specialists learn better, faster, and more sustainably over time.

*With TECH you will experience a way of learning that is shaking the foundations of traditional universities around the world.*



According to Dr. Gervas, the clinical case is the annotated presentation of a patient, or group of patients, which becomes a "case", an example or model that illustrates some peculiar clinical component, either because of its teaching power or because of its uniqueness or rarity. It is essential that the case is based on current professional life, trying to recreate the real conditions in the physician's professional practice.

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*Did you know that this method was developed in 1912, at Harvard, for law students? The case method consisted of presenting students with real-life, complex situations for them to make decisions and justify their decisions on how to solve them. In 1924, Harvard adopted it as a standard teaching method”*

The effectiveness of the method is justified by four fundamental achievements:

1. Students who follow this method not only achieve the assimilation of concepts, but also a development of their mental capacity, through exercises that evaluate real situations and the application of knowledge.
2. Learning is solidly translated into practical skills that allow the student to better integrate into the real world.
3. Ideas and concepts are understood more efficiently, given that the example situations are based on real-life.
4. Students like to feel that the effort they put into their studies is worthwhile. This then translates into a greater interest in learning and more time dedicated to working on the course.



## Relearning Methodology

At TECH we enhance the case method with the best 100% online teaching methodology available: Relearning.

This university is the first in the world to combine the study of clinical cases with a 100% online learning system based on repetition, combining a minimum of 8 different elements in each lesson, a real revolution with respect to the mere study and analysis of cases.

*Professionals will learn through real cases and by resolving complex situations in simulated learning environments. These simulations are developed using state-of-the-art software to facilitate immersive learning.*



At the forefront of world teaching, the Relearning method has managed to improve the overall satisfaction levels of professionals who complete their studies, with respect to the quality indicators of the best online university (Columbia University).

With this methodology, more than 250,000 physicians have been trained with unprecedented success in all clinical specialties regardless of surgical load. Our pedagogical methodology is developed in a highly competitive environment, with a university student body with a strong socioeconomic profile and an average age of 43.5 years old.

*Relearning will allow you to learn with less effort and better performance, involving you more in your specialization, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation to success.*

In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically.

The overall score obtained by TECH's learning system is 8.01, according to the highest international standards.



This program offers the best educational material, prepared with professionals in mind:



#### Study Material

All teaching material is produced by the specialists who teach the course, specifically for the course, so that the teaching content is highly specific and precise.

These contents are then applied to the audiovisual format, to create the TECH online working method. All this, with the latest techniques that offer high quality pieces in each and every one of the materials that are made available to the student.



#### Surgical Techniques and Procedures on Video

TECH introduces students to the latest techniques, the latest educational advances and to the forefront of current medical techniques. All of this in direct contact with students and explained in detail so as to aid their assimilation and understanding. And best of all, you can watch the videos as many times as you like.



#### Interactive Summaries

The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This exclusive educational system for presenting multimedia content was awarded by Microsoft as a "European Success Story".



#### Additional Reading

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.





#### Expert-Led Case Studies and Case Analysis

Effective learning ought to be contextual. Therefore, TECH presents real cases in which the expert will guide students, focusing on and solving the different situations: a clear and direct way to achieve the highest degree of understanding.



#### Testing & Retesting

We periodically evaluate and re-evaluate students' knowledge throughout the program, through assessment and self-assessment activities and exercises, so that they can see how they are achieving their goals.



#### Classes

There is scientific evidence on the usefulness of learning by observing experts. The system known as Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.



#### Quick Action Guides

TECH offers the most relevant contents of the course in the form of worksheets or quick action guides. A synthetic, practical, and effective way to help students progress in their learning.



# 07 Certificate

The Professional Master's Degree in Update on Nephrology guarantees students, in addition to the most rigorous and up-to-date education, access to a Professional Master's Degree issued by TECH Technological University.





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*Successfully complete this program and receive your university qualification without having to travel or fill out laborious paperwork”*

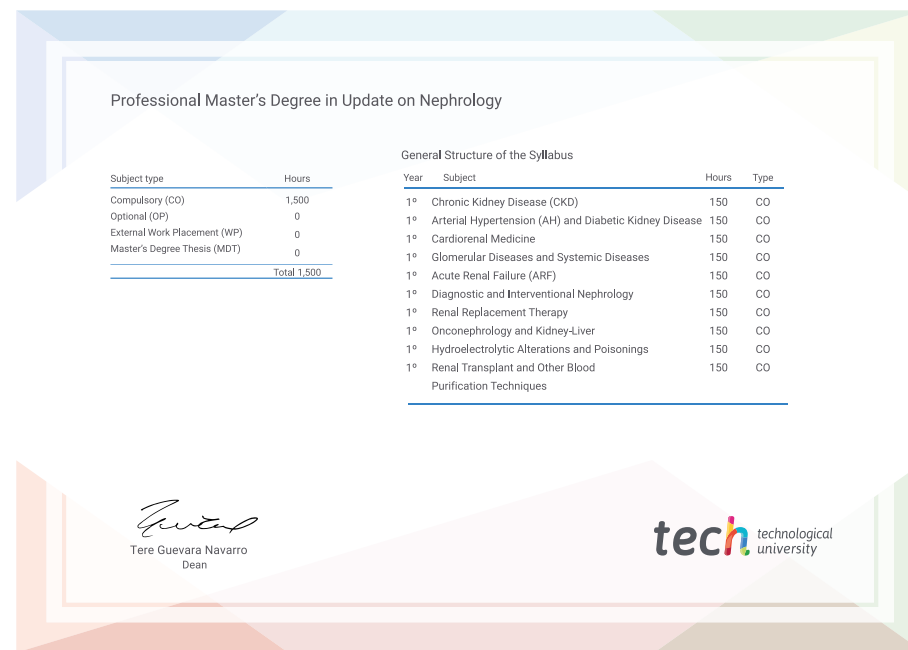
This **Professional Master's Degree in Update on Nephrology** contains the most complete and up-to-date scientific program on the market.

After the student has passed the assessments, they will receive their corresponding **Professional Master's Degree** issued by **TECH Technological University** via tracked delivery\*.

The certificate issued by **TECH Technological University** will reflect the qualification obtained in the Professional Master's Degree, and meets the requirements commonly demanded by labor exchanges, competitive examinations, and professional career evaluation committees.

Title: **Professional Master's Degree in Update on Nephrology**

Official N° of Hours: **1,500 h.**



\*Apostille Convention. In the event that the student wishes to have their paper certificate issued with an apostille, TECH EDUCATION will make the necessary arrangements to obtain it, at an additional cost.



## Professional Master's Degree Update on Nephrology

- » Modality: online
- » Duration: 12 months
- » Certificate: TECH Technological University
- » Dedication: 16h/week
- » Schedule: at your own pace
- » Exams: online

# Professional Master's Degree

## Update on Nephrology

