



MEDTEC SCHOOL

Course: Dermatology, Infectious disease, Rheumatology

Year (1st-2nd-3rd-4th-5th-6th): 5th

Period (1st-2nd semester – annual): 2nd semester

Credits: 7

Objectives

This integrated course includes three sections, i.e. dermatology, infectious diseases, and rheumatology and clinical immunology. The goal of the course will be to provide the essential information from the three areas while integrating the shared features and conditions, particularly related to immunology and common treatments or complications, well embedded in the spectrum of internal medicine. Dedicated lessons will be held by two teachers from different modules to highlight the common grounds of the three subjects.

In the Dermatology module, starting from skin anatomy and physiology, the course will proceed to describe the elementary lesions of dermatologic disease and their diagnostic significance in different skin affections. The course will cover all major dermatological diseases such as inflammatory skin diseases, bullous skin diseases, infective skin diseases, congenital and genetic skin diseases and skin cancer.

In the Infectious disease module the teaching will move from the relationship to infectious agents, host and the environment in causing colonization, infection and disease to apply basic infection control interventions and understand the principles of antibiotic use and stewardship. Further, students will be required to analyze the diagnostic dilemmas and management opportunities of a broad range of major syndromes affecting the neurological, respiratory, cardio-vascular, digestive, bone and joint and urinary systems. Finally, the clinical and public health implications of major global endemic diseases, including HIV/AIDS, tuberculosis and malaria will be discussed,

In the Rheumatology and Clinical Immunology module, the bases of immune-mediated conditions will be addressed moving from the approach to patients with a rheumatological condition to the use of diagnostic and therapeutic tools to the discussion of specific mechanisms of disease. Dedicated teaching moments will focus on specific conditions or families of diseases, spanning from arthritis to connective tissue disease, generalized pain syndromes, metabolic and degenerative diseases, immunodeficiencies. Treatment options, complications, and shared features will be discussed in particular.

Pre-requisites

A prior understanding of (i) the basic immunology of chronic inflammation, including the mediators and cells of innate and acquired immunity, (ii) the pharmacology of antibiotics, anti-inflammatory, glucocorticoids, (iii) the anatomy of the skin, the musculoskeletal system, and the major apparatuses will be required for the successful attendance to the lessons. As such, students will be required to have attended courses that include modules of anatomy, microbiology, and pharmacology.

Lesson contents / learning objectives

DERMATOLOGY

1. Introduction to Dermatology and approach to the dermatologic patient (2 hours):

- Know the basic principles of skin anatomy and histology
- Identify the basic characteristics of patients coming to dermatologic visit;
- Describe the skin elementary lesions
- Propose possible differential diagnosis
- Determine the need for dermoscopic, histologic or other examinations
- Define the general indications for skin excisional surgery

2. Diagnostics, lasertherapy and technological innovation in Dermatology (2 hours):

- Know the basic principles of dermoscopy and total body photography and their role in differential diagnosis and follow up
- Identify the most common dermoscopic patterns of pigmentary lesions and non-melanoma skin cancers;
- Understand when to ask for a skin biopsy or a complete surgical excision
- Know the principles of the most common surgical procedures
- Project a correct wound defect reconstruction
- Know the basic principles and indications of the most common lasers used for surgical and cosmetical dermatology
- Know the basic principles of confocal microscopy, optical coherence tomography, raster scan optoacoustic mesoscopy and their current and potential role in clinical practice
- Know the current and potential use of artificial intelligence in dermatology
- Learn the basic principles and clinical indications of lasers in dermatology

3. Therapies in dermatology (2 hours)

- Identify the major characteristics of the most common treatments used in the dermatology setting;
- Describe the indications and contraindications of topical and systemic steroids;
- Describe the mechanisms of action, indications and contraindications of systemic conventional drugs;
- Describe the mechanisms of action, indications and contraindications of biologics and small molecules;
- Describe the impact of comorbidities on treatment choices

4. Skin immunology and skin immune-mediated disorders (3 hours):

- To learn the basic principles of Innate and Adaptive Immunity in the Skin
- To know the most common immune-mediated skin disorders (Atopic Dermatitis, Nummular Eczema, Lichen Simplex Chronicus, and Prurigo Nodularis, Seborrheic Dermatitis, Pityriasis Rubra Pilaris, Lichen Planus)
- To propose a clinical diagnosis and to know which test to perform in doubtful cases
- Principles of therapy of immune-mediated skin disorders with a particular focus on atopic dermatitis



5. Cutaneous adverse drug reactions (2 hours):

- Know the most common causes and manifestations of adverse skin drug reactions (Drug-related Maculo-papular rash, Urticaria and Angioedema, Erythroderma, Steven-Johnson syndrome and toxic epidermal necrolysis, Fixed drug eruption, Dress syndrome, Acute generalized exanthematous pustulosis, Graft-versus-Host Disease)
- Propose a differential diagnosis;
- Understand when to hospitalize a patient with an adverse cutaneous drug reaction
- Know when to perform blood tests and skin biopsies
- Learn the basic principles for managing cutaneous adverse drug reactions

6. Bullous disorders (2 hours):

- Describe the groups of bullous disorders;
- Understand the pathogenesis and the most common histological findings of bullous disorders
- Understand the role of autoantibodies in bullous disorders
- Propose a diagnosis on the basis of the clinical manifestations and histology
- Learn the principles of management of bullous disorders

7. Pigmentary, sebaceous and adnexal disorders (2 hours):

- Know the biology of melanocytes
- Understand the epidemiology and pathogenesis of pigmentary disorders
- Know principles of differential diagnosis of pigmentary disorders
- Learn Principles of medical, surgical and cosmetic management of pigmentary disorders
- Know the Biology of Sebaceous Glands
- Learn the Pathogenesis, epidemiology and differential diagnosis of hidradenitis suppurativa, rosacea and acne
- Know the Biology of Hair Follicles
- Learn pathogenesis, clinics and differential diagnosis of alopecias
- Basic principles of management of alopecia
- Know the Biology of Nails
- Recognize the nail manifestations of skin and systemic disorders
- Learn the basic principles of differential diagnosis and management of nail manifestations

8. Skin carcinogenesis and pigmentary lesions (2 hours)

- Know the most important mechanisms of genome instability, DNA repair, and cancer
- Learn principles of chemical and ultraviolet radiation carcinogenesis
- Learn the different benign neoplasias and hyperplasias of melanocytes
- Learn the clinical and dermoscopic approach to pigmentary lesions (Benign neoplasias and hyperplasias of melanocytes, atypical melanocytic nevi, cutaneous melanoma)
- Learn principles of immunotherapy and targeted therapies in advanced melanoma

9. Non-melanoma skin cancers (1 hour):

- Learn which are the most common epithelial precancerous lesions and what is the concept of "field of cancerization"



- Learn the Pathogenesis, clinics and epidemiology of Squamous Cell Carcinoma
- Learn the Pathogenesis, clinics and epidemiology of Basal Cell Carcinoma and hedgehog pathway
- Know the most common Benign Epithelial Tumors, Hamartomas, and Hyperplasias
- Learn the Pathogenesis, clinics and epidemiology of Squamous Cell Carcinoma
- Know Principles of Field and lesion-directed therapies for actinic keratosis and field of cancerization
- Understand the correct approach to Clinical and dermoscopic differential diagnosis of non-melanoma skin cancers
- Learn the most important concepts on Immunotherapy and hedgehog inhibitors for non-melanoma skin cancers

10. Cutaneous Lymphomas (2 hours)

- Understand the pathogenesis, epidemiology and clinics of Mycosis fungoides, Sezary syndrome, Primary cutaneous B-Cell lymphoma, Granulomatous slack skin syndrome, Lymphomatoid papulosis
- Know the major histologic features of cutaneous lymphomas
- Propose a potential differential diagnosis of cutaneous lymphomas
- Understand the basic principles of cutaneous lymphomas management
- Understand which are the inflammatory diseases that simulate lymphomas (Parapsoriasis and Pityriasis Lichenoides, Cutaneous Pseudolymphomas, Cutaneous Langerhans Cell Histiocytosis and Non-Langerhans Cell Histiocytosis, Mastocytosis)

INFECTIOUS DISEASE.

1. Introduction to Infectious Diseases (2 hours)

- Definition of Infectious Diseases and transmission routes
- How to get infected
- Community/Hospital acquired Infections
- Prophylactic measures and isolation procedures for epidemiological control of ID
- Principles of appropriate antibiotic use
- Antimicrobial stewardship

2. Upper and lower respiratory tract infections, Tuberculosis (6 hours)

- Community-acquired and hospital-acquired pneumonia: deepened knowledge of the disease. Definition, incidence, risk factors, epidemiology, clinical findings, diagnosis and principles of treatment
- Ventilator associated pneumonia (VAP): Definition, incidence, epidemiology, clinical findings, diagnosis and principles of treatment
- Legionellosis: Incidence, prevention, clinical findings, diagnosis and principles of treatment
- COVID-19: Incidence, prevention, clinical findings, diagnosis and principles of treatment
- Influenza: Incidence, prevention, clinical findings, diagnosis and principles of treatment of
- Tuberculosis: Epidemiology, pathogenesis, clinical presentation of pulmonary and extra-pulmonary tuberculosis. Diagnosis and principles of treatment.



3. Central nervous System Infections (2 hours)

- Acute bacterial meningitis. Deepened knowledge of the disease. Epidemiology, microbiology, pathogenesis, clinical features, diagnosis, principles of treatment, chemoprophylaxis
- Viral infections of the CNS. Epidemiology, microbiology, clinical features, diagnosis, principles of treatment

4. HIV, AIDS (2 hours)

- History and social stigma. Deepened knowledge of the disease. Pathogenesis, diagnosis, clinical presentation, principles of therapy
- AIDS-related opportunistic infections: “don’t miss” diagnosis.
- Pneumocystis jirovecii pneumonia, cytomegalovirus infection, toxoplasmosis, progressive multifocal leukoencephalopathy, Kaposi’s sarcoma, esophageal candidiasis: Clinical presentation and principles of therapy

5. Cardiovascular Infections (2 hours)

- Endocarditis: Deepened knowledge of the disease: definition, incidence, risk factors, epidemiology, clinical findings, diagnosis and principles of treatment

6. Urinary tract infections (UTI) (2 hours)

- Knowledge of the main clinical features and key-points in order to distinguish the different forms. Epidemiology, diagnosis, principles of treatment
- a. *Inappropriate use of antibiotics in UTI*
- b. *UTI in special populations*

7. Sepsis (1 hour)

- Deepened knowledge of the disease. Definition, clinical management and principles of treatment

8. Gastrointestinal and intrabdominal infections (3 hours)

- Clostridium difficile colitis: deepened knowledge of the disease. Epidemiology, pathogenesis, risk factors, control strategies and isolation, clinical findings, diagnosis, principles of treatment
- Infectious diarrhoea and enteric fever: Epidemiology, risk factors, control strategies, clinical findings, diagnosis, principles of treatment
- Pyogenic and amoebic hepatic abscess: Epidemiology, pathogenesis, risk factors, clinical findings, diagnosis and principles of therapy of liver abscesses

9. Systemic Infections (2 hours)

- Epidemiology, clinical presentation. Diagnosis and principles of treatment.
- Toxoplasmosis
- EBV Infection
- CMV infection

10. Zoonosis and Vector borne diseases (4 hours)



- Malaria. Deepened knowledge of the disease. Epidemiology, control strategies, parasite life cycle, clinical findings, diagnosis, principles of treatment, prophylaxis
- Epidemiology, microbiology, clinical presentation. Diagnosis and principles of treatment of:
 - Rickettsiosis
 - Brucellosis
 - Leishmaniosis
 - Lyme disease
 - American and African trypanosomiasis

11. Emerging Infectious Diseases (2 hours)

- Epidemiology, transmission, knowledge of the main clinical features and key-points of the different diseases. Principles of diagnosis.
 - West Nile
 - Zika Virus
 - Ebola
 - Dengue
 - Chikungunya

12. Appropriate use of antibiotics (2 hours)

- Classes, pharmacokinetics and pharmacodynamics of antibacterial agents
- Principle of correct use of antibiotics
- Interpretation of antibiotic susceptibility test

RHEUMATOLOGY AND CLINICAL IMMUNOLOGY

1. Introduction to Rheumatology: approach to the patient with rheumatic diseases (2 hours)

- Identify the major features of patients attending a rheumatology clinic;
- Formulate possible differential diagnoses;
- Determine the best areas for specific diagnostic tests (lab and imaging)
- Describe the major symptoms/syndromes leading to the suspect of arthritis, vasculitis, connective tissue disease;
- Discriminate between diagnostic and classification criteria

2. Introduction to Rheumatology: biomarkers (1 hour)

- Identify the major serum patterns and lab abnormalities of patients attending a rheumatology clinic;
- Formulate possible differential diagnoses based on lab results;
- Determine the ideal lab tests based on the clinics;
- Describe the established associations between autoantibodies and disease

3. Introduction to Rheumatology: medical treatments (1 hour)

- Identify the major characteristics of the treatments used in the rheumatology setting;
- Describe the indications and contraindications of steroids and NSAIDs;
- Describe the mechanisms of action, indications and contraindications of DMARDs;



- Describe the mechanisms of action, indications and contraindications of biologics and small molecules;
- Describe the impact of comorbidities on treatment choices

4. Rheumatoid arthritis (2 hours)

- Determine the epidemiology and risk factors of rheumatoid arthritis, seronegative and seropositive;
- Determine the pathogenesis of rheumatoid arthritis, seronegative and seropositive, with a specific focus on autoantibodies, TNFalpha, IL6, JAKs;
- Understand the differential diagnosis of rheumatoid arthritis;
- Understand the major imaging (X ray, CT, MRI, ultrasound), invasive (arthrocentesis, etc), and laboratory (autoantibody, CRP) findings that are helpful in the diagnosis and management of patients with rheumatoid arthritis;
- Understand the therapeutic approach to rheumatoid arthritis with a specific focus on recommendations / guidelines;

5. Back pain and spondyloarthritis (1 hour)

- Describe the major symptoms/syndromes associated with back pain;
- Define spondyloarthritis;
- Understand the epidemiology, pathogenesis, and differential diagnosis of ankylosing spondylitis and spondyloarthritis;
- Understand the differential diagnosis of ankylosing spondylitis and spondyloarthritis;
- Understand the major imaging (X ray, CT, MRI, ultrasound), invasive (arthrocentesis, etc), and laboratory (autoantibody, CRP) findings that are helpful in the diagnosis and management of patients;
- Understand the therapeutic approach to ankylosing spondylitis and spondyloarthritis with a specific focus on recommendations / guidelines;

6. Reactive and IBD-associated arthritis (1 hour)

- Describe the major symptoms/syndromes leading to the suspect of reactive arthritis;
- Describe the major symptoms/syndromes leading to the suspect of IBD associated arthritis;
- Understand the epidemiology, pathogenesis, and differential diagnosis of reactive, enteropathic arthritis;
- Understand the differential diagnosis of reactive, enteropathic arthritis;
- Understand the major imaging (X ray, CT, MRI, ultrasound), invasive (arthrocentesis, etc), and laboratory (autoantibody, CRP) findings that are helpful in the diagnosis and management of patients;
- Understand the therapeutic approach to reactive, enteropathic arthritis with a specific focus on recommendations / guidelines;

7. Connective tissue diseases: systemic lupus erythematosus (1 hour)

- Describe the groups of connective tissue disease (i.e. systemic lupus, scleroderma, inflammatory myositis, Sjogren syndrome, undifferentiated and mixed connective tissue disease) and their peculiar features;



- Understand the epidemiology, pathogenesis, and differential diagnosis of systemic lupus erythematosus;
- Understand the differential diagnosis of systemic lupus erythematosus;
- Understand the major imaging (X ray, CT, MRI, ultrasound), invasive (arthrocentesis, etc), and laboratory (autoantibody, CRP) findings that are helpful in the diagnosis and management of patients with systemic lupus erythematosus;
- Understand the cardiovascular, neoplastic, obstetric, and thrombotic complications of systemic lupus erythematosus
- Understand the therapeutic approach to systemic lupus erythematosus;

8. Connective tissue diseases: systemic sclerosis (1 hour)

- Understand the epidemiology, pathogenesis, and differential diagnosis of systemic sclerosis;
- Understand the therapeutic approach to systemic sclerosis;
- Understand the differential diagnosis of systemic sclerosis;
- Understand the major imaging (X ray, CT, MRI, ultrasound), invasive (arthrocentesis, etc), and laboratory (autoantibody, CRP) findings that are helpful in the diagnosis and management of patients with systemic sclerosis;
- Understand the cardiovascular, neoplastic, obstetric, and thrombotic complications of systemic sclerosis

9. Connective tissue diseases: polymyositis / dermatomyositis (1 hour)

- Understand the epidemiology, pathogenesis, and differential diagnosis inflammatory myositis;
- Understand the therapeutic approach to inflammatory myositis;
- Understand the differential diagnosis of inflammatory myositis;
- Understand the major imaging (X ray, CT, MRI, ultrasound), invasive (arthrocentesis, etc), and laboratory (autoantibody, CRP) findings that are helpful in the diagnosis and management of patients with inflammatory myositis;
- Understand the cardiovascular, neoplastic, obstetric, and thrombotic complications of inflammatory myositis

10. Connective tissue diseases: Sjogren's syndrome (1 hour)

- Understand the epidemiology, pathogenesis, and differential diagnosis of Sjogren's syndrome;
- Understand the therapeutic approach to Sjogren's syndrome;
- Understand the differential diagnosis of Sjogren's syndrome;
- Understand the major imaging (X ray, CT, MRI, ultrasound), invasive (arthrocentesis, etc), and laboratory (autoantibody, CRP) findings that are helpful in the diagnosis and management of patients with Sjogren's syndrome;
- Understand the cardiovascular, neoplastic, obstetric, and thrombotic complications of Sjogren's syndrome

11. The mechanisms of localized and generalized pain (2 hours)

- Understand the mechanisms and pathways leading to pain sensitivity;

- Describe the diagnostic and therapeutic approach to localized and generalized pain syndromes;
- Understand the features of fibromyalgia and chronic fatigue syndrome with particular attention to the differential diagnosis and therapeutic approaches;

12. Degenerative cartilage disease (2 hours)

- Describe the major symptoms/syndromes leading to the suspect of osteoarthritis and its complications;
- Describe the risk factors for osteoarthritis;
- Understand the differential diagnosis of osteoarthritis;
- Understand the epidemiology, pathogenesis, and differential diagnosis of osteoarthritis;
- Understand the therapeutic approach to osteoarthritis, including non pharmacological treatments;
- Understand the major imaging (X ray, CT, MRI, ultrasound), invasive (arthrocentesis, etc), and laboratory (autoantibody, CRP) findings that are helpful in the diagnosis and management of patients with osteoarthritis;
- Understand the cardiovascular and metabolic comorbidities of osteoarthritis

13. Immunodeficiencies (2 hours)

- Describe the major symptoms/syndromes leading to the suspect of acquired and congenital immunodeficiency;
- Understand the classification of acquired and congenital immunodeficiency;
- Understand the epidemiology, pathogenesis, and differential diagnosis of acquired and congenital immunodeficiency;
- Understand the therapeutic approach to acquired and congenital immunodeficiency, including the prevention of infections;
- Understand the major laboratory findings that are helpful in the diagnosis and management of patients with acquired and congenital immunodeficiency;

JOINT LECTURES

1. Cutaneous and Soft tissue Infections (Dermatology + Infectious disease, 2 hours)

- Knowledge of the main clinical features and key-points to distinguish the different forms of skin and soft tissue infections. Epidemiology, diagnosis, principles of treatment
- Impetigo, Cellulitis, Erysipelas
- Staphylococcal Toxic Shock Syndrome
- Necrotizing fasciitis and gas gangrene
- Animal bite infection

- Learn the correct approach to diagnose and treat the exanthematous diseases
- Diagnose and manage Erisipela and cellulitis

2. Infectious and sexually transmitted diseases (Dermatology + Infectious disease, 2 hours)



- Learn pathogenesis, epidemiology and clinics of sexual transmitted diseases (Syphilis, HPV infections, Herpes virus infections)
- Principles of diagnosis and treatment of sexual transmitted diseases
- Learn the differential diagnosis and treatment of yeast infections
- Learn the differential diagnosis and treatment of infestations (scabies and pediculosis)

3. **Bone and joint infections (Rheumatology + Infectious disease, 2 hours)**

- Haematogenous and nonhaematogenous osteomyelitis: pathogenesis, clinical findings, diagnosis and principles of treatment
- Infective *arthritis*: Clinical findings, diagnosis, treatment of septic arthritis

4. **Psoriatic disease (Dermatology + Rheumatology, 2 hours)**

From the dermatology viewpoint:

- Psoriasis epidemiology and pathogenesis
- Distinguishing the different clinical forms of psoriasis
- Basic principles of psoriasis management based on the most recent guidelines
- When to refer a patient with PSO/PSA to a dermatologist/rheumatologist?

From the rheumatology viewpoint:

- Describe the major symptoms/syndromes leading to the suspect of psoriatic arthritis;
- Understand the epidemiology, pathogenesis, and differential diagnosis of psoriatic arthritis;
- Understand the differential diagnosis of psoriatic arthritis;
- Understand the major imaging (X ray, CT, MRI, ultrasound), invasive (arthrocentesis, etc), and laboratory (autoantibody, CRP) findings that are helpful in the diagnosis and management of patients;
- Understand the therapeutic approach to psoriatic arthritis with a specific focus on recommendations / guidelines;

5. **Vasculitides (Dermatology + Rheumatology, 2 hours)**

- Describe the major symptoms/syndromes leading to the suspect of vasculitis;
- Understand the new classification of vasculitides;
- Understand the epidemiology, pathogenesis, and differential diagnosis of vasculitides;
- Understand the therapeutic approach to vasculitides, including non-pharmacological treatments;
- Understand the major imaging (X ray, CT, MRI, ultrasound), invasive (vascular biopsy, etc), and laboratory (autoantibody, CRP) findings that are helpful in the diagnosis and management of patients with vasculitides;
- Understand the systemic complications and sequelae of vasculitides

Teaching Methods

The teaching hours will be predominantly *ex cathedra* with the inclusion also of (1) clinical case discussions for all three areas, (2) direct evaluation of patients (either in person or remotely, synchronous or asynchronous), (3) flipped classroom. In all settings, students will be encouraged to ask questions and comment on the contents presented.



Assessment

Assessment of the knowledge of the contents of this course will be evaluated with a final exam composed of a written multiple-choice question test followed by an oral exam when indicated.

Content of written test (60 questions): dermatology (20), infectious diseases (20), rheumatology (20). Questions will include the whole program of the course as well as clinical vignettes with suggested diagnostic or therapeutic decisions being most likely. The written examination will be evaluated with a score from 0 to 30 by adding 0.5 points with each correct answer.

In case the candidate obtains a score below 18/30 in the written exam, the exam will be failed and no oral exam will be allowed.

In case the candidate obtains a score below 25/30 in the written exam, she/he will have to necessarily sustain the oral exam of all three sections and a positive evaluation must be obtained in all to pass.

In case the candidate obtains a score equal to or above 25/30 in the written test, the oral exam will be at discretion of the candidate.

Oral questions will refer to all topics from program of the course and will also include clinical case discussions.

In all cases, if the candidate takes the oral exam, the score obtained in the written test might be confirmed or changed (becoming higher or lower) based on the oral exam performance.

Texts

For all modules, the most recent review articles for general physician readers will be provided during the course via LMS. In addition, specific sections on the Harrison's principles of Internal Medicine should be also utilized.

For optional deeper evaluation of specific areas:

Sewon Kang et al. Fitzpatrick's Dermatology, 9th Edition, 2-Volume Set (Fitzpatrick's Dermatology in General Medicine) McGraw-Hill Education, 2019

Mandell, Douglas and Bennett's Infectious Diseases Essentials, 1st Edition, 2016

EULAR Textbook on Rheumatic Diseases:

http://www.eular.org/index.cfm?framePage=/edu_textbook.cfm