

## COURSE SYLLABUS

### Digestive Health

2526-5-H4102D043

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#### Aims

The Vertical Tract of the Digestive system in an integrated course that includes the following modules:

- Normal and Pathologic Anatomy
  - Physiology
  - Pharmacology
  - Diagnostics (Radiology)
  - Surgery (liver, biliary tract and digestive system)
  - Hepato-Gastroenterology
- this part of the tract is followed by the activities of the Clerkship 9 (see Syllabus dedicated to Clerkship 9)

\*\*the aims of active learning refer specifically to:

1. knowledge and comprehension (what the student knows at the end of the course);
  2. ability to apply knowledge and comprehension ("what the student is able to do at the end of the course, that is to say which are the acquired skills).
- moreover, the course aims to allow the development of "transversal skills" (soft skills), through multidisciplinary interactions between different scientific sectors:
- critical and judgment skills (laboratory, MD groups, interactive classes, MC questions preparation);
  - communication skills of what has been learned (PBL sessions, interactive sessions);
  - capability of pursuing study skills after the end of the course (autonomous study, lesson preparation in the context of the "flipped classroom principles)

To follow the details of each module

#### Anatomy of the Digestive Tract

Aims: acquiring an in-depth knowledge of gastrointestinal system viscera, with a focus also on: vascularisation, lymphatic drainage, relationship with peritoneum/ligaments; revision of the main features of the abdominal wall.

## **Physiology**

The course aims to enable medical students to understand the physiological processes underlying the physiology of the gastrointestinal tract. This will provide them with the tools to consciously address the aspects related to the pharmacology and pathology of the GI tract itself.

## **Pharmacology**

Main aim of the course is to provide students with gastrointestinal pharmacology. The course will present and describe available pharmacological strategies for the treatment of gastric pathologies (gastric acidity, ulcers, esophageal reflux), gastrointestinal motility, emesis, hepatic and pancreatic diseases, gut inflammation. Mechanism of action, therapeutic properties, drug interactions, and side effects will be presented.

## **Pathology**

To provide the pathology knowledge underlying different diseases affecting the digestive system.

At the end of the course the student will be able to:

1. Integrate the clinical data with cytological, histological and molecular aspects of different digestive system diseases.
2. Understand the pathobiology of these entities.
3. Employ normal histology knowledge and others basic disciplines for understanding organs and/or apparatus pathologies.
4. Critically evaluate the commonly used diagnostic methods in pathology

## **Diagnostics (Radiology)**

To provide the basic knowledge concerning the most important imaging modalities and their clinical use in the context of gastroenterologic radiology. The role of conventional radiology and of cross sectional imaging, including hybrid modalities will be assessed.

The main purpose of the course is to illustrate the potential of these imaging techniques in order to determine correct clinical management of the diseases.

## **Surgery**

The course aims to equip students with the necessary tools and knowledge to make accurate clinical diagnoses of various surgical diseases, to formulate appropriate differential diagnoses among different pathological entities, and to establish the foundations for correct surgical (and non-surgical) treatment indications by providing technical and strategic tools for treating different diseases

## **Gastroenterology and Hepatology**

The primary goal of the course is to provide students with the pathophysiologic basis of the digestive and liver systems in order to make correlations between the inner mechanisms of diseases and their clinical expression. The student will be able to interpret symptoms, signs and laboratory tests as well as radiologic and endoscopic findings. Clinical tools to understand concepts of organ-limited disease, system involvement or systemic disease will be provided.

## **Contents**

### **Anatomy of the Digestive Tract**

Detailed description of abdominal viscera and revision of abdominal wall main features.

### **Physiology**

The course is based on the systematic presentation of physiological concepts underlying the functioning of the digestive tract. The mechanism leading to function imbalance cannot be appreciated without a deep understanding of the underlying biophysical and physiological mechanisms. Therefore, we will present such mechanisms that guarantee functions at the cellular, tissue, organ and apparatus level and at the integrated level.

During the course, the effects of the aging process on the physiology of the gastrointestinal system and the effects due to gender differences will be emphasized

### **Pharmacology**

Main classes of drugs, mechanisms of action, drug interactions and precautions.

### **Pathology**

The course will address the pathogenetic, histological, cytological and molecular aspects of various neoplastic and non-neoplastic pathologies of the digestive tract, addressing the correlations with the clinical/instrumental data through case examples and references to the literature, with hints at the increasingly important role of the application of digital and molecular pathology methods in this field of human pathology.

### **Diagnostics (Radiology)**

Conventional X rays examination efficacy in various clinical settings. Computed tomography, and magnetic resonance will be extensively discussed as the pillars of gastroenterologic radiology. The potential of ultrasound examination will be shown

### **Surgery**

Principle of diagnosis and treatment of benign and malignant pathologies of oesophagus, upper GI, pancreas, lower GI, spleen, abdominal wall, biliary tract and liver with reference to hepatic transplantation

### **Gastroenterology and Hepatology**

Principle of diagnosis and treatment of benign and malignant pathologies of oesophagus, upper and lower GI tract, pancreas, biliary tract and liver

## **Detailed program**

### **Anatomy of the Digestive Tract**

Surface anatomy: surface landmarks of the abdominal wall: xiphoid process, costal margin, iliac crest, pubic tubercle, symphysis pubis, inguinal ligament, superficial inguinal ring, umbilicus, linea alba, linea semilunaris and tendinous intersections of the rectus abdominis. Abdominal lines: transpyloric plane, subcostal plane, intercostal plane. Abdominal quadrants.

Abdominal wall: anterolateral and posterior abdominal wall. Skin, superficial fascia, deep fascia. Muscles: external and internal oblique, transversus, rectus abdominis, pyramidalis. Rectus sheath. Fascia transversalis. Arteries, veins, lymph vessels and nerves of the anterolateral abdominal wall. Inguinal canal: deep and superficial inguinal rings, walls of the inguinal canal.

Peritoneum: general arrangement, ligaments, omenta, mesenteries, peritoneal cavity. Relationships of the different organs to their peritoneal covering. Intraperitoneal, retroperitoneal and subperitoneal organs. Peritoneal pouches, spaces and recesses. Lesser sac and epiploic foramen. Functions of the peritoneum.

Detailed description of gastrointestinal system viscera and associated glands: position, shape, size, parts, relations, vascularisation, lymphatic drainage, and innervation of: stomach, duodenum, cecum, ascending, descending and transverse colon, appendix, liver, gallbladder, pancreas. A specific focus is given on portal system.

### **Physiology**

- Functions and general characteristics. Structure of the gastro-intestinal tract. Secretion. Motility.
- Nervous control of the digestive function. Enteric nervous system. Electrophysiology of smooth muscle cells of the gastrointestinal tract.
- Hormonal control of motility of the gastrointestinal tract (gastrin, CCK, secretin).
- The oral cavity.
- The chemical senses of taste: physiology of taste and smell. Salivary secretion. Stomach and gastric secretion (composition and regulation).

- Intestinal secretions. Pancreatic secretion (composition and regulation). Liver secretion (composition and regulation). Digestion and absorption.

### **Pharmacology**

Drugs for the treatment of gastric acidity, peptic ulcer, esophageal reflux.

Drugs for the control of gastrointestinal motility: prokinetics and treatment of stypsis and diarrhea.

Drugs for the treatment and prevention (vaccines) of hepatic and pancreatic diseases.

Anticancer drugs for the treatment of gastrointestinal neoplasia.

Work in groups: the microbiome.

### **Pathology**

The Digestive Pathology course will focus on the following topics:

Precancerous lesions of the intestine and classification of intestinal polyps

Adenocarcinoma of the colon

Gastric precancerous lesions and stomach adenocarcinoma

Neuroendocrine tumors of the digestive system

Fine needle aspiration (FNA) in the characterization of pancreatic lesions

### **Diagnostics (Radiology)**

Conventional digital radiology as a basic approach in emergency. CT and MRI techniques as the most important means to determine the diagnosis and to generate the adequate follow up protocols. Basic information about the method of image interpretations will be provided

### **Surgery**

Use of different surgical technologies (minimally invasive laparoscopic surgery and minimally invasive robotic surgery).

Basics of emergency surgery.

Surgical treatment of abdominal wall defects.

Surgical treatment for esophageal pathology, upper and lower gastrointestinal tract conditions.

Surgical treatment of spleen pathology.

Surgical treatment of pancreatic disease with particular reference to the treatment of pancreatic malignancy.

Surgical treatment of the hepatobiliary tract, with particular reference to the indication for minimally invasive liver surgery and liver transplantation, including for oncological diseases of the liver and intra- and extra-hepatic bile ducts.

### **Gastroenterology and Hepatology**

Autoimmune liver/Cholestatic diseases

Pancreatitis

IBD/Celiac disease

DILI

Multidisciplinary approach to NAFLD

Viral Hepatitis

Storage diseases

Acute alcoholic hepatitis

Endoscopy in PSC

AI in radiology

Cirrhosis 1

GI Bleeding

Upper GI

Cirrhosis 2

ACLF

Multidisciplinary lessons:

--Chronic Hepatitis

• Pathology & Diagnostic

• Clinical Hepatology

--HCC and liver transplant

- Pathology & Diagnostic
- Clinical Hepatology
- Interventional Radiology
- Surgery

--IBD + Microbiota:

- Pathology & Diagnostic
- Clinical Gastroenterology
- Endoscopy
- Surgery

--GI TUMORS:

- Pathology & Diagnostic
- Clinical Gastroenterology
- Endoscopy
- Surgery

PBL

Neuroendocrine tumors

GI bleeding (upper lower)

Acute abdomen(diverticulitis, peritonitis, perforations)

Esophageal disorders

## **Prerequisites**

Knowledge of the preparatory courses as indicated in the regulations of the degree course in Medicine and Surgery.

Fundamental knowledge on cell biology and general pharmacology

Fundamentals of Human Physiology.

Basic knowledge of human anatomy, physiology, and general pathology

Anatomy and histology

## **Teaching form**

### **Anatomy of the Digestive Tract**

10 hours held over 2 days in the Anatomy room (Monza, Asclepio building): didactic activities will be divided into a frontal lesson and an interactive part. Both parts will rely on live virtual dissections via Anatomage table. Students will be divided into group and perform dissections directly; a gamification approach will be used (tournament among groups).

### **Physiology**

8 hours of lectures (didactic mode) and 2 hours of interactive lessons.

### **Pharmacology:**

8 hours frontal lessons.

2 hours interactive lesson: work in groups

### **Pathology**

10 hours in-person oral lessons

### **Diagnostics (Radiology)**

10 hours frontal lessons in presence

### **Surgery and Gastroenterology and Hepatology**

#### **Surgery A:**

10 hours of frontal and interactive lectures & Multidisciplinary sessions in presence

#### **Chirurgia 2**

10 hours of frontal and interactive lectures & Multidisciplinary sessions in presence

#### **Gastroenterologia & Epatologia A**

10 hours of frontal and interactive lectures & Multidisciplinary sessions in presence

#### **Gastroenterologia & Epatologia B**

10 hours of frontal and interactive lectures & Multidisciplinary sessions in presence

#### **Gastroenterologia & Epatologia C**

10 hours of frontal and interactive lectures & Multidisciplinary sessions in presence

within the Vertical Tract of Digestive & Liver Disease sessions of Problem-based Learning & Case-based Learning in presence shall be held

## **Textbook and teaching resource**

### **Anatomy of the Digestive Tract**

Treatise on Human Anatomy (Systemic Approach), Topographic Approach, Atlas - G. Anastasi G. et al.; E. Mtui (editor).

Gray's Anatomy: The Anatomical Basis of Clinical Practice, by S. Standring.

Atlas of Human Anatomy, by F. H. Netter.

Human Anatomy Atlas, by G. Anastasi, E. Gaudio, C. Tacchetti, E. Mtui.

### **Physiology**

Guyton & J.E. Hall, Textbook of Medical Physiology, Elsevier;

Boron WF, Boulpaep EL, Medical Physiology, Ed. Elsevier.

Reviews or scientific papers recommended by the Professor During Lectures

### **Pharmacology**

Bertram G. Katzung "Basic and clinical pharmacology" 14th Edition. LANGE

Goodman & Gilman "The Pharmacological Basis of Therapeutics" 13th Edition, Laurence L. Brunton, Randa Hilal-Dandan, Björn C. Knollmann. McGraw-Hill Education

Rang & Dale "Pharmacology" 14th Edition, Elsevier.

### **Pathology**

Kumar V, Abbas A K, Aster J C; Robbins and Cotran Pathologic Basis of Disease Elsevier, 10th ed

### **Diagnostics (Radiology)**

Textbook of gastrointestinal radiology. Richard M Gore ed. Elsevier Health Europe

### **Surgery**

Lessons on power point slides with references to national and international guidelines

Sabiston. Textbook of Surgery. Saunders

F. Minni. Chirurgia Generale. Zanichelli

F. D'Amico. Manuale di Chirurgia Generale. Piccin

References available on the scientific biomedical resource Pubmed

## **Gastroenterology and Hepatology**

- Sleisinger & Fordtran's Gastrointestinal and Liver Disease E-dition. Text with Continually Updated Online Reference ([www.sfgastro.com](http://www.sfgastro.com)): Pathophysiology, Diagnosis, Management & Liver Disease (Sleisinger/Fordtran). Eds: Feldman, Mark; Friedman, Lawrence; Brandt, Lawrence J. ISBN: \* 978-1-4160-3245-8.
- Harrison's Principles of Internal Medicine: The 20th edition of the book, edited by Dennis Kasper, Anthony Fauci, Stephen Hauser, Dan Longo, J. Larry Jameson and Joseph Loscalzo, (17 August 2018). The 21st edition of the book to be released on 28 March 2022
- Zakim and Boyer's Hepatology. A Textbook of Liver Disease. Seventh Edition (2018) (Edited by: Arun J. Sanyal, Thomas D. Boyer, Norah A. Terrault, and Keith D. Lindor)
- Clinical Gastrointestinal Endoscopy: A Comprehensive Atlas. (2018) Ed. Hoon Jai Chun, Suk-Kyun Yang, Myung-Gyu Choi
- Malattie Dell'apparato Digerente 2019-2022: Unigastro (Editrice Gastroenterologica Italiana)
- Reviews

## Semester

II semester

## Assessment method

Before being allowed to sustain the oral examination the student should meet the following requirements:

- 70% of attendance to the GI Clerkship
- Approval from the tutor of the acquisition of the required skills\*\* (details of the skills in syllabus Clerkship 9 Gastroenterology & Hepatology I & II)
- to sustain and pass the written Multiple Choice Test (a minimum score of 27 out of 45)
- the oral examination shall be carried out by a multidisciplinary team of teachers, in order to cover all the topics  
(basic & clinical GI) presented during the course according with the present syllabus, with the discussion of both  
open issues and case-based clinical evaluation

All assessments will be carried out in English language

## Office hours

The teachers are reachable by e-mail

**Anatomy of the Digestive Tract:** \*[paola.alberti@unimib.it](mailto:paola.alberti@unimib.it) \*

**Physiology:** [ilaria.rivolta@unimib.it](mailto:ilaria.rivolta@unimib.it)

**Pharmacology:** [laura.musazzi@unimib.it](mailto:laura.musazzi@unimib.it)

**Pathology**

**Diagnostics (Radiology)**

**Surgery**

**Gastroenterology and Hepatology:** [stefano.faggioli@unimib.it](mailto:stefano.faggioli@unimib.it)

## Sustainable Development Goals

GOOD HEALTH AND WELL-BEING | QUALITY EDUCATION | GENDER EQUALITY

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