UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Gastroenterology and Hepatology

2627-5-H4102D043-H4102D185M

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 ststem)
- Hepato-Gastroenterology
  this part of the tract is followed by the activities of the Clerkship 9 (see Syllabus dedicated to Clerkship 9)

To follow the details of each module

Anatomy of the Digestive Tract
To provide a correlation between genera normal anatomy and more frequent lesions adn diseases of digestive system.

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.
Aims / Learning outcomes according to the Dublin Descriptors
1. Knowledge and understanding
At the end of the course, students will have acquired integrated knowledge of the anatomy, physiology, pharmacology, pathology, diagnostic imaging, surgical principles, and clinical gastroenterology and hepatology related to the digestive system.
Students will understand the pathophysiological mechanisms underlying benign and malignant diseases of the oesophagus, stomach, intestine, pancreas, biliary tract and liver, including inflammatory, metabolic, infectious, autoimmune, vascular, neoplastic and transplant-related conditions.
They will also understand the relationships between normal structure and function, pathological alterations, clinical manifestations, laboratory findings, imaging, endoscopic features and therapeutic approaches.

2. Applying knowledge and understanding
Students will be able to apply their knowledge to the interpretation of symptoms, signs, laboratory tests, histological, radiological and endoscopic findings in patients with gastrointestinal and liver diseases.
They will be able to formulate diagnostic hypotheses and differential diagnoses, identify appropriate diagnostic pathways, and understand the rationale for medical, pharmacological, endoscopic, radiological and surgical treatment strategies.
Through multidisciplinary lessons, problem-based learning and case-based learning, students will apply basic science and clinical knowledge to realistic clinical scenarios, including gastrointestinal bleeding, acute abdomen, chronic liver disease, inflammatory bowel disease, gastrointestinal tumours, viral hepatitis, pancreatitis and hepatocellular carcinoma.

3. Making judgements
Students will develop the ability to critically evaluate clinical, laboratory, pathological, radiological and endoscopic data in order to support diagnostic and therapeutic decision-making.
They will be able to assess the appropriateness of diagnostic investigations and treatment indications, taking into

account disease severity, patient characteristics, clinical context, risks and expected benefits.
Students will also be encouraged to critically appraise multidisciplinary approaches, clinical guidelines and scientific evidence relevant to gastroenterology, hepatology and digestive surgery.

4. Communication skills
Students will be able to communicate clinical reasoning, diagnostic hypotheses and therapeutic proposals using appropriate medical terminology and a multidisciplinary perspective.
They will be able to discuss gastroenterological and hepatological cases with teachers and peers, integrating contributions from pathology, radiology, surgery, pharmacology and clinical medicine.
Students will also develop the ability to present and justify their clinical decisions clearly and coherently, including during oral examination and case-based discussion, in English.

5. Learning skills
Students will acquire the learning skills necessary to further develop their knowledge in gastroenterology, hepatology and digestive diseases during clinical clerkships and future medical practice.
They will be able to use textbooks, scientific literature, guidelines and biomedical databases to update their knowledge and to support evidence-based clinical reasoning.
The course will promote autonomous study, integration of basic and clinical sciences, and continuous learning through lectures, multidisciplinary teaching, problem-based learning and case-based learning.

Contents

Anatomy of the Digestive Tract
Correlate anatomy and pathology of different digestive system diseases
Understand clinical-pathological correlations
Critical evalution the evolution of various non neoplastic pathologies

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
Non neoplastic eosophageal and gastric diseases
Celiac disease
Idiopathic bowel inflammatory disease
Non neoplastic pathology of the liver

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 emergengy. 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 interpretationswill 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, phisiology, and general pathology

Anatomy and histology

Teaching form

Anatomy of the Digestive Tract
In person oral lessons

Physiology
The schedule includes 8 hours of lectures (didactic mode) and 2 hours of interactive lessons.

Pharmacology:
4 2-h frontal lessons.
1 interactive lesson: work in groups

Pathology
Delivered with in-person oral lessons

Diagnostics (Radiology)
5 front lessons of 2 hours in attendance

Surgery and **Gastroenterology and Hepatology**
Lessons
Multidisciplinary Lessons
Problem-based Learning
Case-based Learning

Textbook and teaching resource

Anatomy of the Digestive Tract
https://www.pathologyoutlines.com/

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): 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 meed the following requirements:

- 70% of attendance to the GI Clerckship
- 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 weritten Multiple Choice Test (a minimum score of 27 out of 45)
- the oral examination shall be carried out by a multidisciplinary team od teachers, in order to cover all the topics
  (basic & clinical GI) presented during the course according with the present sillabus, 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
Physiology: *ilaria.rivolta@unimib.it*
Pharmacology: *laura.musazzi@unimib.it*
Pathology
Diagnostics (Radiology)
Surgery
Gastroenterology and Hepatology: *stefano.fagiuoli@unimib.it*

Sustainable Development Goals

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