

Course Title	Clinical Pathophysiology			
Course Code	MED-404			
Course Type	Required			
Level	Undergraduate			
Year / Semester	Year 4/ Semester 7 (Spring)			
Teacher's Name	<p>Course Lead: Dr Ben Patterson</p> <p>Other contributors: Dr Yiannis Kolocassides Dr Evagoras Economides Prof Marios Panos Prof Efthymoulos Anastasiades Dr Stelia Ioannidou Kadis Prof Gabriel Kalakoutis Prof Savvas Papacostas Dr Petros Leptos Dr Yiola Marcou Dr Elpida Mina</p>			
ECTS	6	Lectures / week	4	Laboratories / week / 0
Course Purpose and Objectives	<p>The main objectives of the course are:</p> <ol style="list-style-type: none"> 1. To provide the students with an understanding of (a) the signs and symptoms and (b) the pathophysiology of the main disorders of the cardiovascular system, respiratory system, gastrointestinal system, endocrine system, renal system, reproductive system, central and peripheral nervous system, musculoskeletal system, and skin. 2. Establish a knowledge base for various clinical problems encountered in Internal Medicine and introduce the fundamental concepts of pathophysiology in the clinical setting. 3. Ease the transition from the basic sciences to clinical medicine. 			
Learning Outcomes	<p>The following list provides the learning objectives that will be covered in the lectures and tutorials of each week:</p> <p>Week 1</p> <p>LOBs covered during lectures:</p>			

1. Recognise the multi-system differential diagnosis of a chest pain presentation (Lecture: Chest Pain 1).
2. Describe the key history, examination and investigation findings of common conditions presenting with chest pain including Myocardial Infarction, Aortic Dissection, Angina, Pericarditis, Pulmonary Embolus, Pneumothorax, Pneumonia, Pulmonary Malignancy, Peptic Ulcer Disease, Ruptured Oesophagus, Oesophageal Reflux, Oesophageal Spasm, Costochondritis and Herpes Zoster (Lecture: Chest Pain 1).
3. Identify a normal 12-lead ECG in terms of the rate, rhythm, axis, waves, complexes, intervals and segments (Lecture: Intro to ECG).
4. Recognise ECG features associated with Myocardial Infarction, Pericarditis, LVH, RVH and Cardiac Tamponade (Lecture: ECG Interpretation 1).
5. Demonstrate the ability to lay out a case presentation in a structured manner including all common sections of the history, examination and investigations (Lecture: Structure of a Case Presentation).
6. Develop a differential diagnosis list for a chest pain presentation in order of likelihood (Lecture: Chest Pain Clinical Scenarios 1).

Week 2

LOBs covered during lectures:

7. List the main emergency causes of chest pain. (Lecture: Chest Pain 2).
8. Recognise the key findings of diagnostic tests for chest pain. (Lecture: Chest Pain 2).
9. Describe the diagnostic approach to chest pain as an emergency. (Lecture: Chest Pain 2).
10. Recognise the other localising and non-localising symptoms that may have a cardiac aetiology (Lecture: Chest Pain 2).
11. Describe the features of typical and atypical chest pain. (Lecture: Chest Pain 2).
12. Recognise ECG features associated with cardiac arrhythmias (incl. AF, Aflutter, V.tach, V.fib, Heart block, Bundle Branch Blocks). (Lecture: ECG interpretation 2).
13. Recognise the advantages and disadvantages of the commonly used imaging modalities in disease diagnosis: Plain X-rays, Ultrasound, CT scan and MRI (Lecture: introduction to imaging).
14. Recognise the advantages and disadvantages of X-rays in diagnosis (Lecture: Introduction to X rays).
15. Identify the normal anatomical landmarks on a chest radiograph. (Lecture: Introduction to X rays).
16. Recognise the projection, penetration, rotation, inspiration and artifact of a normal chest radiograph. (Lecture: Introduction to X rays).
17. Develop a differential diagnosis list for a chest pain presentation in order of likelihood (Lecture: Chest Pain Clinical Scenarios 2).

Week 3

LOBs covered during lectures:

18. Describe the multi-system differential diagnosis of an acute cough and a chronic cough presentation (Lecture: Cough)
19. Describe the key history, examination and investigation findings for common conditions presenting with acute and chronic cough including ACUTE: Foreign Body Inhalation Upper Respiratory Tract Infection, Pneumonia, Infective Exacerbation of Chronic Obstructive Pulmonary Disease; CHRONIC: Bronchial Carcinoma, Pulmonary TB, Asthma, COPD, Congestive Cardiac Failure, Gastro-oesophageal Reflux Disease, Rhino-sinusitis, Bronchiectasis, Diffuse Parenchymal Lung Disease, Medications (Lecture: Cough)
20. Recognise the chest radiograph features associated with pulmonary infection and pleural disease. (Lecture: Chest X-ray pathology 1 & 2)
21. Recognise the chest radiograph features associated with heart failure, malignancy and connective tissue disease. (Lecture: Chest X-ray pathology 3).
22. Demonstrate a systematic approach to forming a differential diagnosis (Lecture: Approach to differential diagnosis).
23. Develop a differential diagnosis list for an acute cough presentation in order of likelihood (Lecture: Cough Clinical Scenarios).
24. Develop a differential diagnosis list for a chronic cough presentation in order of likelihood (Lecture: Cough Clinical Scenarios).

Week 4

LOBs covered during lectures:

25. Describe the differential diagnosis of acute and chronic dyspnoea presentations. (Lecture: Shortness of breath).
26. Describe the key history, examination and investigation findings of common conditions presenting with acute and chronic dyspnoea including ACUTE: Aspiration, Anaphylaxis, Myocardial Infarction, Cardiac Arrhythmia, Pulmonary Oedema, Pneumothorax, Asthma Attack, Pulmonary Embolism, Metabolic Acidosis, Panic Attack; CHRONIC: Lung Malignancy, Pleural Effusion, Lobar Collapse, Respiratory Muscle Weakness, COPD, Bronchiectasis, Diffuse Parenchymal Diseases, Anaemia, Congestive Cardiac Failure, Pulmonary Hypertension, Neuromuscular Disorders (Lecture: Shortness of breath).
27. Describe how pulmonary function testing can be used to distinguish between causes of chronic dyspnoea. (Lecture: Shortness of breath).
28. Recognise the chest radiograph features associated with heart failure, malignancy and connective tissue disease. (Lecture: Chest x ray pathology 4).
29. Develop a differential diagnosis list for a acute dyspnoea presentation in order of likelihood (Lecture: Shortness of Breath Clinical Scenarios).

30. Develop a differential diagnosis list for a chronic dyspnoea presentation in order of likelihood (Lecture: Shortness of Breath Clinical Scenarios).

Week 5

LOBs covered during lectures:

31. Describe the differential diagnosis of an acute abdominal pain presentation. (Lecture: Acute Upper Abdominal Pain).
32. Describe the key history, examination and investigation findings of common conditions presenting with acute upper abdominal pain: Acute Hepatitis, Gallbladder pathologies, Congestive Hepatopathy, Oesophagitis, Peptic Ulcer Disease, Pancreatitis, Perforated Oesophagus, Abdominal Aortic Aneurysm, Splenic Pathology, Intra-abdominal Abscess, Pyelonephritis, Renal/Ureteric Colic, Testicular Torsion (Lecture: Acute Upper Abdominal Pain).
33. Demonstrate a systematic approach to arterial blood gas interpretation (Lecture: Arterial blood gas analysis 1).
34. Recognise the advantages and disadvantages of ultrasound in the diagnosis of disease (Lecture: introduction to ultrasound).
35. Recognise the clinical use of ultrasound and CT imaging in the diagnosis of abdominal pathology. (Lecture: Abdominal imaging interpretation).
36. Identify the main abnormalities observed in arterial blood gas analysis. (Lecture: Arterial blood gas analysis 2).
37. Develop differential diagnosis lists for acute upper abdominal presentations in order of likelihood (Lecture: Upper Abdominal Pain Clinical Scenarios).

Week 6

LOBs covered during lectures:

38. Describe the differential diagnosis of an acute lower abdominal pain presentation. (Lecture: Acute Lower Abdominal Pain).
39. Describe the key history, examination and investigation findings of common conditions presenting with acute lower abdominal pain: Describe the key history, examination and investigation findings of common conditions presenting with acute lower abdominal pain: Appendicitis, Crohn's Disease, Ulcerative Colitis, Cystitis, Urinary Retention, Diverticulitis, Sigmoid Volvulus (Lecture: Acute Lower Abdominal Pain).
40. Describe the key history, examination and investigation findings of common conditions presenting with acute acute generalised abdominal pain: Gastroenteritis, Infectious Colitis, Mesenteric Ischaemia, Irritable Bowel Syndrome (Lecture: Acute Lower Abdominal Pain).
41. Identify the main pathologies observed in liver function tests. (Lecture: Liver Function Test Analysis).
42. Describe the differential diagnosis of upper and lower gastrointestinal bleeding (Lecture: Gastrointestinal Bleeding).

43. Describe the key history, examination and investigation findings of common conditions presenting with upper gastrointestinal bleeding: Duodenal/Gastric Ulcer, Gastro-oesophageal Varices, Erosive Oesophagogastritis, Mallory-Weiss Tear, Gastric Tumour; and lower gastrointestinal bleeding: Colonic carcinoma, Diverticular Bleeding, Inflammatory Bowel Disease, Infective Colitis, Angiodysplasia (Lecture: Gastrointestinal Bleeding).
44. Develop differential diagnosis lists for acute lower abdominal presentations in order of likelihood (Lecture: Lower Abdominal Pain Clinical Scenarios).

Week 7

LOBs covered during lectures:

45. Describe the presentation and complications of type I and II diabetes. (Lecture: Diabetes Clinical Presentations & Complications).
46. Describe the key history, examination and investigation findings of diabetes presentations including Accelerated Atherosclerosis, Cerebrovascular Disease, Peripheral Vascular Disease, Diabetic Ulcer, Retinopathy, Nephropathy, Neuropathies, Hypoglycaemic Coma, Diabetic Ketoacidosis, Hyperosmolar non-Ketotic Coma (Lecture: Diabetes Clinical Presentations & Complications).
47. Recognise the acute endocrine presentations associated with pheochromocytoma, adrenocortical insufficiency, thyrotoxicosis, myxoedemic coma and hypercalcaemia. (Lecture: Other acute endocrine interpretations).
48. Recognise the use of the common tests used to diagnose acute endocrine pathologies. (Lecture: Endocrine test interpretation).
49. Recognise acute endocrine clinical presentations (Lecture: Endocrine Clinical Scenarios).

Week 8

LOBs covered during lectures:

50. Describe the diagnostic approach to a raised creatinine. (Lecture: Investigation and Management of Raised Creatinine).
51. Describe the causes and manifestations of acute and chronic renal failure. (Lecture: Investigation and Management of Raised Creatinine).
52. Recognise and interpret common abnormalities in biochemistry lab tests. (Lecture: Biochemistry Lab Interpretation and Urinalysis).
53. Recognise the common pathologies identified on a urinalysis. (Lecture: Biochemistry Lab Interpretation and Urinalysis).
54. Describe the differential diagnosis of haematuria and proteinuria. (Lecture: Haematuria & Proteinuria).
55. Describe the key history, examination and investigation findings of common conditions presenting with Haematuria including: Renal Calculus, Pyelonephritis, Renal Cell Carcinoma, Glomerulonephritis,

Cystitis, Transitional Cell Carinoma, Prostate Carcinoma (Lecture: Haematuria & Proteinuria).

56. Describe the key history, examination and investigation findings of common conditions presenting with Proteinuria including: Nephrotic Syndrome and associated causes (Lecture: Haematuria & Proteinuria).
57. Recognise the use of the various renal imaging modalities in the diagnosis of common renal pathologies (Lecture: Renal imaging).
58. Recognise acute renal and urological clinical presentations (Lecture: Renal and Urological Clinical Scenarios).

Week 9

LOBs covered during lectures:

59. Outline the differential diagnosis of vaginal bleeding presentation. (Lecture: Vaginal Bleeding).
60. Describe the key history, examination and investigation findings of common conditions presenting with vaginal bleeding including: Pelvic Inflammatory Disease, Uterine Fibroids, Cervical/Endometrial Polyps, Endometriosis, Malignancy of Endometrium/Cervix/Vulva/Ovary/Fallopian Tube (Lecture: Vaginal Bleeding).
61. Outline the differential diagnosis of abdominal pain with a gynaecological cause (Lecture: Abdominal Pain (Gynaecological Origin)).
62. Describe the key history, examination and investigation findings of common conditions presenting with abdominal pain with a gynaecological cause including: Ovarian cyst (rupture, torsion, haemorrhage), Salpingitis, Ectopic Pregnancy, Uterine Fibroids. (Lecture: Abdominal Pain (Gynaecological Origin)).
63. Outline the differential diagnosis of a breast mass. (Lecture: Presentation of Breast Pathology).
64. Describe the history, examination features and investigation findings of common conditions presenting with a breast mass. (Lecture: Presentation of Breast Pathology).
65. Recognise the use of ultrasound imaging of the female reproductive tract. (Lecture: Reproductive system imaging).
66. Recognise the use of imaging modalities in diagnosis of breast pathology. (Lecture: Reproductive system imaging).
67. Develop differential diagnosis lists for acute Vaginal Bleeding and Gynaecological Abdominal Pain in order of likelihood. (Lecture: Reproductive System Clinical Scenarios).

Week 10

LOBs covered during lectures:

68. Describe the differential diagnosis of an Inflamed Joint. (Lecture: Inflamed Joint Presentation).

69. Describe the key history, examination and investigation findings of common conditions presenting with an inflamed joint including: Septic Arthritis, Gout, Pseudogout, Traumatic Haemarthrosis, Osteoarthritis, Rheumatoid Arthritis, Seronegative Arthropathies, Systemic Lupus Erythematosus, Sarcoidosis, Polymyalgia Rheumatica (Lecture: Inflamed Joint Presentation).
70. Describe the use of imaging in the diagnosis of joint and bone pathology. (Lecture: X rays of the musculoskeletal system).
71. Outline how synovial fluid analysis aids in the diagnosis of joint pathology. (Lecture: Analysis of synovial fluid).
72. Recognise the features on history, examination and the investigations which inform diagnosis of SLE, Rheumatoid Arthritis, Sarcoidosis, Systemic Sclerosis and Adult onset Still's Disease. (Lecture: Multi-system disorders).
73. Recognise musculoskeletal and multi-system disorder presentations (Lecture: Musculoskeletal & Multi-system Disorder Clinical Scenarios).

Week 11

LOBs covered during lectures:

74. Outline the relevant history, examination and investigations for a stroke presentation (Lecture: Stroke and Neurological Imaging).
75. Recognise the role of Neurological Imaging in Stroke (Lecture: Stroke and Neurological Imaging).
76. Outline the differential diagnosis of a headache presentation. (Lecture: Headache).
77. Describe the key history, examination and investigation findings of common conditions presenting with headache including: Meningitis/Encephalitis, Haemorrhage, Cerebral Venous Thrombosis, Giant Cell Arteritis, Carotid/Vertebral Artery Dissection, Acute Angle-Closure Glaucoma, Malignant Hypertension, Tension Headache, Cluster Headache, Migraine, Rebound, Raised ICP, Normal-Pressure Hydrocephalus (Lecture: Headache).
78. Outline the differential diagnosis of an altered mental state. (Lecture: Acute Confusional State Presentations).
79. Describe the diagnostic approach to an altered mental state presentation. (Lecture: Acute Confusional State Presentations).
80. Develop differential diagnosis lists for an altered mental state presentation in order of likelihood (Lecture: Acute Confusional State Scenarios).

Week 12

LOBs covered during lectures:

81. Describe the differential diagnosis of a fever. (Lecture: Fever).
82. Describe the key history, examination and investigation findings of common conditions presenting with a fever including: Pneumonia, UTI,

	<p>Meningitis, Encephalitis, Endocarditis, Osteomyelitis, Hepatitis, Cellulitis, Surgical Wound, Intravenous Line, Malignancy, Connective Tissue Disease, DVT/PE, Drug Fever, Alcohol Withdrawal, Transfusion Reaction (Lecture: Fever).</p> <p>83. Describe the key history, examination and investigation findings of common conditions presenting with a rash (of infectious origin) including: BACTERIAL: Cellulitis, Impetigo, Staphylococcal Scalded Skin Syndrome, Lyme Disease; VIRAL: Measles, Rubella, Parvovirus B19, Molluscum contagiosum, HPV warts, secondary Syphilis, HSV, VZV; FUNGAL: Ringworm, Candida; PARASITIC: Scabies (Lecture: Rashes of infectious origin).</p> <p>84. Describe the key history, examination and investigation findings of common conditions presenting with a rash (non-infectious origin) including: Eczema, Seborrhoeic Dermatitis, Psoriasis, Urticaria, Erythema Nodosum, Severe Drug Reaction (TEN/SJS), Bullous Pemphigoid, Pemphigus Vulgaris, Actinic Keratosis, Skin Malignancy (SCC, BCC, MM) (Lecture: Rashes of non-infectious origin).</p> <p>85. Develop differential diagnosis lists for fever in order of likelihood (Lecture: Fever Clinical Scenarios).</p>		
Prerequisites	MED-304 Pathology I MED-309 Pathology II	Required	None.
Course Content	<ul style="list-style-type: none"> • Chest Pain 1 & 2 • Intro to ECG • ECG Interpretation 1 & 2 • Structure of a Case Presentation • Chest Pain Clinical Scenarios 1 & 2 • Intro to Imaging • Intro to Chest X-Ray • USMLE Questions on Cardiovascular system • Cough • Chest X-Ray Pathology 1, 2, 3 & 4 • Approach to Differential Diagnosis (The Surgical Sieve) • Cough Clinical Scenarios • Shortness of Breath • Arterial Blood Gas Analysis 1 & 2 • Shortness of Breath Clinical Scenarios • USMLE Questions on Respiratory System • Acute Upper Abdominal Pain • Introduction to ultrasound • Abdominal Imaging Interpretation • Upper Abdominal Pain Clinical Scenarios 		

	<ul style="list-style-type: none"> • Acute Lower Abdominal Pain • Liver Function Test Analysis • Gastrointestinal Bleeding • Lower Abdominal Pain Clinical Scenarios • USMLE Questions on Gastrointestinal System • Diabetes Clinical Presentations & Complications • Other Acute Endocrine Presentations • Endocrine Test Interpretation • Endocrine Clinical Scenarios • Investigation and Management of Raised Creatinine • Biochemistry Lab Interpretation and Urinalysis • Haematuria & Proteinuria • Renal imaging • Renal and Urological Clinical Scenarios • Vaginal Bleeding Presentations • Reproductive system imaging (ultrasound of female reproductive tract and breast) • Abdominal Pain (Gynaecological Origin) • Breast Mass • Reproductive System Clinical Scenarios • Stroke and Neurological Imaging • Headache • Acute Confusional State Presentations • Acute Confusional State Scenarios • USMLE Questions on Renal and Nervous System • Inflamed Joint • Analysis of Synovial Fluid • X-rays of musculoskeletal system • Multi-system Disorders • Musculoskeletal & Multi-system Disorder Clinical Scenarios • Fever • Rashes of infectious origin • Rashes of non-infectious origin • Fever Clinical Scenarios
Teaching Methodology	Lectures, Tutorials.

Bibliography	Required Textbooks/Reading:				
	Authors	Title	Publisher	Year	ISBN
	Gary D. Hammer & Stephen J. McPhee	Pathophysiology of Disease (An Introduction to Clinical Medicine)	McGraw Hill (LANGE)	2014	9780071806008
	Recommended Textbooks/Reading:				
	Authors	Title	Publisher	Year	ISBN
Aaron Berkowitz	Clinical pathophysiology made ridiculously simple	MedMaster	2007	9780940780804	
Stefan Silbernagl & Florian Lang	Color Atlas of Pathophysiology	Thieme	2016	9783131165534	
Assessment	On-line Formative Midterm Exam and Summative Final Exam. The Summative Final Exam will contribute towards 100% of the course grade. Assessment is by Single Best Answer MCQs (SBAs) and there may also be some Short Answer Questions (SAQs).				
Language	English				