

Course Title	Histology I			
Course Code	MED-202			
Course Type	Required			
Level	Undergraduate			
Year / Semester	Year 2/ Semester 3 (Fall)			
Teacher's Name	Course Lead: Dr Annita Achilleos Contributor: Dr Danijela Antunović			
ECTS	6	Lectures / week	2	Laboratories / week / 1.5
Course Purpose and Objectives	The main objectives of this course are: <ul style="list-style-type: none"> To acquire a basic background in histology and to understand the properties of cells and their interactions with one another as components of tissues and organs. To understand how structure and function correlate at the microscopic level. To be able to describe the normal structure and function of various cell types, tissues, and organs, and to differentiate their histological structures from each other through examination. To acquire basic background on embryology and to understand the first weeks of development. To describe the growth of the foetus and the maturation of the organ systems. To discuss the clinical correlations of birth defects for each organ system development. 			
Learning Outcomes	Week 1 LOBs covered during lectures: Embryology <ol style="list-style-type: none"> Describe oogenesis (female gametogenesis) and spermatogenesis (male gametogenesis). Discuss the first week of development, from the ovarian cycle to cleavage and blastocyst formation. Discuss examples of birth defects of the first week development. Discuss the day-by-day development during the second week of gestation. (Days 8-13). Outline the development of embryoblast and trophoblast. Explain what is meant by abnormal implantation and ectopic pregnancy. 			

7. Describe gastrulation, and vasculogenesis.
8. Outline the formation of the notochord and the establishment of axes.
9. Briefly discuss teratogenesis and birth defects associated with laterality.
10. Outline the changes at the end of pregnancy and time of birth.

LOBs covered during practical:

11. Outline the different steps taken to prepare a biopsy specimen for visualization.

Week 2

LOBs covered during lectures:

Histology

12. Describe the method of tissue preparation for histological examination.
13. Outline the principles of histochemistry and immunohistochemistry.
14. Describe the function of the different types of microscopy utilized in histology.
15. Outline the histological features of the plasma membrane and cellular organelles, correlating them with their function.
16. Describe the membranous and non-membranous organelles of the cell.
17. Explain the distinguishing features of the four major tissue types (epithelial, connective, muscle, nervous).
18. List of different types of epithelial cells and briefly discuss the function of each (apical, lateral, basal).
19. Describe the accessory structural features of epithelial cells such as microvilli, cilia and cell-to-cell contacts.
20. Distinguish between exocrine and endocrine glands and give examples of each.

LOBs covered during practical:

11. Outline the different steps taken to prepare a biopsy specimen for visualization.

Week 3

LOBs covered during lectures:

Histology

21. List the classification of connective tissue and their major histologic features.
22. Describe the two major classes of connective tissue cells.
23. Describe the different components of the ECM and their microscopic features.
24. Briefly discuss the characteristics of special connective tissue.

Week 4

No lectures during this week.

Week 5

LOBs covered during lectures:

Histology

25. Describe the histology and function of the different layers of the heart.
26. Outline the different microscopic features of arteries and veins.
27. Identify the differences between different types of arteries (from elastic artery to arteriole) and veins (from large vein to venule).

Embryology

28. Discuss the formation of the heart tube.
29. Outline the formation of aorticopulmonary and the atrial septa.
30. Outline the formation of atrioventricular and interventricular septa.

Embryology – Clinical correlation

31. Describe the clinical correlations of heart development including genetic abnormalities, laterality and cardiac looping abnormalities, valve and outflow tract defects and arterial system defects.

LOB covered during practical:

32. Identify the different types of connective tissue under the microscope.

Week 6

LOBs covered during lectures:

Histology

33. Describe the histology of the conducting portion of respiratory system (nasal cavity, pharynx, larynx, trachea, bronchi).
34. Discuss the histology of the respiratory portion of the system (intrapulmonary bronchial tree, bronchioles, and alveoli).

Embryology

35. Describe the formation of the gut tube, the body cavity and the thoracic cavity.
36. Describe the formation of the upper and lower respiratory system

LOB covered during lab practical:

37. Distinguish between the trachea, bronchi and bronchiole in a microscopic specimen.
38. Identify heart tissue in a microscopic specimen.
39. Distinguish between the trachea, bronchi and bronchioles in a microscopic specimen.

Formative Midterm Exam

Week 7

LOBs covered during lectures:

Histology

40. Describe the general histological features of the tongue, and the salivary glands.
41. Describe the general histological morphology of the teeth.
42. Outline the different histological features of the upper GI tract (oesophagus and stomach) and describe the function of the accessory cells.
43. Outline the different histological features of the lower GI tract (small and large intestine, rectum) and describe the function of the accessory cells.

Embryology

44. Outline the derivatives of the foregut, midgut and hindgut.
45. Discuss the formation of the mesenteries and the anal canal.

Week 8

LOBs covered during lectures:

Histology

49. Explain the two models that describe the structure of the liver with regards to functional units (lobule vs acinus).
50. Describe the zonal distribution of hepatocytes and its functional significance.
51. Outline the major morphological features of the gallbladder and pancreas.

Embryology

52. Discuss the development of foetus.
53. Outline the structure of the placenta and its components (decidua basalis and villous chorion).
54. Outline structure of the umbilical cord, and amniotic fluid.
55. Discuss birth defects related to placenta and cord development.

LOB covered during lab practical:

46. Identify the histological features of tongue, glands, oesophagus, stomach, small and large intestine tissue by microscopic examination.
47. Identify the microscopic architecture of the liver based on the lobular and acinus models.
48. Identify the histological features of the gallbladder and the pancreas.

Week 9

LOBs covered during lectures:

Histology

56. Outline the different cells types found in the blood and describe their morphologic features.
57. List the different stages of hemopoiesis.
58. Describe the histologic features of lymphatic vessels.
59. Describe the histological features of the spleen, thymus and lymph node.

LOB covered during lab practical:

60. Identify the major types of cells in a blood smear.
61. Identify the structure of the spleen, thymus and lymph nodes in a microscopic specimen.

Week 10

LOBs covered during lectures:

Histology

62. Describe the major histological features of the pituitary gland, hypothalamus and pineal gland.
63. Outline the three classes of hormones secreted by the endocrine system.
64. Describe the general mechanism and regulation of hormone secretion.
65. Describe the major histological features and general function of the thyroid gland.
66. Describe the histology and function of the parathyroid gland.
67. Describe the major histologic features and general function of the adrenal glands.

LOB covered during lab practical:

60. Identify the major types of cells in a blood smear.
61. Identify the structure of the spleen, thymus and lymph nodes in a microscopic specimen.

Week 11

No lectures during this week.

LOB covered during lab practical:

68. Differentiate between principal and oxyphil cells in the parathyroid gland.

Week 12

Histology

Revision

Prerequisites	None	Required	None
Course Content	<p>Topics covered in lectures</p> <p>Histology</p> <ul style="list-style-type: none"> • Introduction to Histology • Human Cell: Histological features of organelles and cellular processes • Tissues: Concepts and Classification <ul style="list-style-type: none"> ○ Epithelial Cells and Glands ○ Connective Tissue and ECM • Cardiovascular System • Respiratory System • Gastrointestinal System <ul style="list-style-type: none"> ○ Digestive System I (Tongue, teeth and salivary glands) ○ Digestive System II (Oesophagus, Stomach, Small Intestine, Large Intestine and Rectum) ○ Digestive System III (Liver, Gallbladder and Pancreas) • Endocrine System <ul style="list-style-type: none"> ○ Overview of the Endocrine System ○ Pituitary Gland/ Hypothalamus/ Pineal Gland ○ Thyroid and Parathyroid Gland and Adrenal Gland • Haemopoietin and Lymphoreticular System <ul style="list-style-type: none"> ○ Blood ○ Lymphatic System <p>Embryology</p> <ul style="list-style-type: none"> • Introduction to embryology and first week of development • Second week of development: bilaminar germ disc • Third week of development: trilaminar germ disc • The embryonic period: the three germ layers • Heart development • The gut tube and the body cavities • Respiratory development • Gastrointestinal development. • Foetus and the placenta • Birth defects and prenatal diagnosis. <p>Topics covered in laboratory practicals</p> <ul style="list-style-type: none"> • Microscopy Training • Practical preparation of frozen sections from transgenic animals • Histology of Epithelia and Connective tissue • Cardiovascular & Respiratory systems • Digestive System • Histology of the Hematopoietic and Lymphoreticular System I • Histology of the Endocrine System I 		
Teaching Methodology	Lectures, Tutorials and Laboratory Practical Sessions.		

Bibliography	Required Textbooks/Reading:					
	Authors	Title	Edition	Publisher	Year	ISBN
	Pawlina, Wojciech	Histology: A Text and Atlas with correlated cell and molecular biology	9 th Int'l Edition	Wolters Kluwer	2023	9781975181574
	Sadler, Thomas	Langman's Medical Embryology	15 th Int'l Edition	Wolters Kluwer	2023	9781975180010
	Geraldine O'Dowd, Sarah Bell, Sylvia Wright	Wheater's functional histology: a text and colour atlas	7 th Edition	Elsevier	2023	9780702083341
	Recommended Textbooks/Reading:					
	Authors	Title	Edition	Publisher	Year	ISBN
	Kierszenbaum Abraham	Histology and Cell Biology: An Introduction to Pathology	5 th Edition new	Elsevier/Sanders	2019	9780323673211
	Gartner L.P. & Hiatt J.L.	BRS Cell Biology and Histology	8 th Edition	Lippincott Williams and Wilkins	2019	9781496396358
	Dudek R.W.	BRS Embryology	6 th Edition	Wolters Kluwer	2014	9781451190380
Assessment	For course MED-202 Histology I there will be a Formative Midterm Exam. The grade for the course will be contributed by a Poster (20%) and a Summative Final Exam (80%). Written exams consist of Single Best Answer MCQs (SBAs) and Short Answer Questions (SAQs).					
Language	English					