

Course Unit	Histotecnology I			Field of study	Biomedical Laboratory Sciences	
Bachelor in	Biomedical Laboratory Sciences			School	School of Health	
Academic Year	2023/2024	Year of study	3	Level	1-3	ECTS credits 5.0
Туре	Semestral	Semester	1	Code	9995-804-3104-00-23	
Workload (hours)	135	Contact hours	T - TP 2 T - Lectures; TP - Lectures a	2,5 PL 30 T nd problem-solving; PL - Problem-	C - S - solving, project or laboratory; TC	Fieldwork; S - Seminar; E - Placement; OT - Tutorial; O - Other

Name(s) of lecturer(s)

Celso Tome dos Santos Lopes, Rossana Pilar Marcelino Correia

Learning outcomes and competences

- At the end of the course unit the learner is expected to be able to:

- At the end of the course unit the rearren's expected to be able to: 1. Understand the histotechnology contribution in the Pathology context. Know the general safety rules in the histopathology laboratory. 2. To know the principles of macroscopic description. Understand the tissue fixation mechanisms. Identify the chemical properties of fixation agents. 3. Recognize the importance and applicability of the decalcification of mineralized tissues. Identify the chemical properties of descaling agents. 4. Recognize the importance and reagents and know their role in each processing step: Dehydration, diaphanization and impregnation. Recognize/solve technical errors. 5. Recognize the equipment/materials for tissue embedding. Know the main embedding rules, recognize technical errors and know how to solve the problems without provide to the final diagnosing.
- prejudice to the final diagnosis. 6. Recognize the equipment / materials for histological section. Know the main microtomy rules, recognize technical errors and know how to solve the problems without prejudice to the final diagnosis
 7. Identify and characterize the main routine histological staining: hematoxylin & eosin. Identify the chemical properties of dyes.
 8. Recognize the purpose of slide mounting and describe the main characteristics of the mounting media used in histology.

Prerequisites

Not applicable

Course contents

The main objective of the curricular unit of Histotecnologia I is to introduce students to sample preparation protocols for optical microscope examination: sample reception and macroscopical registration, fixation, decalcification, tissue processing, tissue embedding, microtomy, tissue staining, slide mouting and main errors that can be identified and solved during the histological technique. Recognize the contribution of digital pathology

Course contents (extended version)

- 1. Introduction to the study of tissues and their diseases The importance of tissue preparation in pathology Evolution of histology techniques Tissue properties and physical considerations

This document is valid only if stamped in all pages

- Itsue properties and physical considerations
 Macroscopy
 General Procedures of macroscopy.
 Macroscopic description of biological material (tissue) sent more often
 Fixation and fixatives
 Tissue degeneration. Types of tissue change.
 Physical fixation methods
 Chemical fixation methods
 Chemical fixation methods

 - General properties of fixatives. The ideal fixative for histology. The choice of the best fixative.
 Compound fixative solutions. General properties of fixative solutions in histology.
 Specific fixative solutions for proteins, lipids, nucleic acids and glycans.
 Factores that influence the quality of fixation.
- Fixation techniques 4. Tissue decalcification
- Decalcification and their importance in histopathology
 Decalcification with acid solutions
- Decalcification with chelating agents
 Decalcification methods

- Decalcification tests
 Decalcification of parafin embedded samples
- Jecatorication of parallel embedded samples
 S. Tissue processing
 General steps in tissue processing
 Types of reagents used during the processing steps
 Factors that influence tissue processing
 - Manual and automatic tissue processing Microwave tissue processing
- 6. Tissue embedding

 Equipment and materials used in tissue embedding
 - Commonly used embedding media Tissue orientation during embedding
- Basic rules to avoid errors 7. Microtomy
- - Microtome types
 Microtome components and funtioning
 Microtome knives
 Floating and adesion of sections to slides

- Solutions to avoid detachment of tissue sections
 Hematoxilin-Eosin (H&E) Stain
 Steps that preceded and precede the staining: Dewax, hydration, dehydration and diaphanization
 Basic principles to H&E staining. Alternatives to H&E staining.
- Manual and automatic staining
- Slide mounting
 Mounting media. Resin media. Aqueous media. Coverslips.
 Slide mounting technique.
- During fixation, tissue processing and decalcification steps.
 During fixation, tissue processing and decalcification steps.
 During tissue embeding and microtomy steps.
 During staining protocol amd mouting steps.

Recommended reading

- Cook D. J. (2006) Cellular Patology: An Introduction to Techniques and Applications, 2nd ed. UK: Scion Publishing, 2007. ISBN 1-904842-30-5
 Kiernan J. A. (2003) Histological & Histochemical Methods Theory & Practice, 5th ed. London: Arnold ISBN 978-1-9048424-2-2
 Freida L. Carson. Histotechnology: A Self-Instrumentation Text, 3rd Ed. ISBN-13: 978-0-89189-581-7; ISBN-10: 0-89189-581
 Kennedy, Alexander (1977). Basic techniques in diagnostic histopathology. Churchill Livingstone : distributed in the U. S. A. by Longman, Edinburgh [Scot.]; New York; ISBN 978-0-443-01464-2
 Kim Suvarna Christopher Layton John Bancroft Bancroft's Theory and Practice of Histological Techniques 8th Edition

Teaching and learning methods

Expositive, experimental, demonstrative and "problem-based learning".

Assessment methods

- Continuous evaluation (Regular, Student Worker) (Final)

 Practical Work 20% (Individual practical exam.)
 Reports and Guides 10% (Individual written report.)
 Intermediate Written Test 70% (Theoretical test with minimum mark of 8, 5 values.)

 Final exam (Regular, Student Worker) (Supplementary, Special)

 Final Written Exam 100% (Minimum 8. 5 for theoretical component.)

Language of instruction

Portuguese, with additional English support for foreign students.

Electronic validation

Celso Tome dos Santos Lopes, Rossana Pilar Marcelino Correia	Josiana Adelaide Vaz	Luis Migue Fernandes Nascimento	Adília Maria Pires da Silva Fernandes
05-02-2024	15-02-2024	15-02-2024	15-02-2024