

Main course information	
Academic subject	Histological and histochemical techniques
Degree course	Cellular and Molecular Biology
Degree class	LM/6
ECTS credits (CFU)	6
Compulsory attendance	Yes
Teaching language	Italian
Accademic Year	2019/2020

Professor/Lecturer	
Name & SURNAME	Maria Mastrodonato
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Tel.	+39 080-5443349
Tutorial time/day	Every day agree with the teacher. It is recommended to contact the teacher by e-mail

Course details	Pass-fail exam/Exam with mark out of 30	SSD code	Type of class
	Exam with mark out of 30	BIO/06	Lecture/workshop

Teaching schedule	Year	Semester
	II	II

Lesson type	CFU/ECTS	Lessons (hours)	CFU/ECTS lab	Lab hours	CFU/ECTS tutorial/workshop	Tutorial/workshop hours	CFU/ECTS field trip	Field trip Hours
		5	40	1	12	0	0	0

Time management	Total hours	Teaching hours	Self-study hours
	150	55	95

Academic Calendar	First lesson	Final lesson
	March 2020	June 2020

Syllabus	
Course entry requirements	Knowledge of cytology and histology, inorganic and organic chemistry
Expected learning outcomes (according to Dublin Descriptors) (it is recommended that they are congruent with the learning outcomes contained in A4a, A4b, A4c tables of the SUA-CdS)	
<i>Knowledge and understanding</i>	Acquisition of basic knowledge for the preparation of a histological sample for light and fluorescence microscopy, with particular regard to histological and histochemical staining techniques, immunohistochemistry and immunofluorescence.
<i>Applying knowledge and understanding</i>	Students will develop skills through laboratory activities on the use of microscopes and main techniques applied, in order to gain autonomy in the evaluation of the results.
<i>Making informed judgements and choices</i>	Students will be able to apply histological and histochemical methodologies in both experimental and pathological investigations, to interpret the microscopic images and analyses the morpho-functional correlations.
<i>Communicating knowledge and understanding</i>	The student should be able to express himself competently on topics related to the histological and histochemical and ultrastructural techniques, demonstrating good communication skills.
<i>Capacities to continue learning</i>	The student should be able to relate competently with morpho-functional approach to the cell and animal tissues

Syllabus	
Course content	Light microscopy techniques. Structure and use of different types of microscopes

	<p>(light, fluorescence and confocal). Comparison between classical and confocal fluorescence microscopy.</p> <p>Histological techniques: fixation, dehydration, paraffin embedding. Paraffin and Frozen Sectioning: use of microtome and cryostat. Mounting on microscope slides.</p> <p>Staining techniques. Staining: origin, structure and chemical classification of dyes. Staining protocols. Histomorphological staining methods (e.g. Haematoxylin-eosin, Masson's Trichrome, Azan-Mallory) Histochemical staining methods (e.g. Feulgen, Methyl green, PAS, Alcian Blu, Alcian Blue-PAS, Toluidine Blue, Oil Red O, SudanN). Glycohistochemistry, N/O linked enzymatic characterization, study of mucins.</p> <p>Blood smear and PAP test (role in screening programs).</p> <p>Immunohistochemical techniques. Theory. Mono and polyclonal antibodies. Labels. Immunohistochemical methods: traditional direct technique and indirect technique. Avidin-biotin technique. Immunoperoxidase and immunophosphates techniques.</p> <p>Antigen retrieval techniques. Blocking endogenous enzymes. Quality control of immunohistochemistry.</p> <p>Structural alterations in experimental and pathological conditions. Necrotic and apoptotic cells, mitochondrial swelling, RER degranulation, cytoskeletal alterations, accumulation and depletion of glycogen, steatosis and hepatic regeneration.</p> <p>Lab activity will be performed to allow students gain the ability to actively design and perform protocols for light microscopy.</p> <p>Laboratory experiences include:</p> <ul style="list-style-type: none"> <li>- the microscopic study of histological preparations of the tissues described during the lessons.</li> <li>- Staining using glycohistochemical techniques.</li> <li>- Observation under the microscope with interpretation of the results obtained from the previous colors.</li> <li>- Preparation of samples for fluorescence microscopy.</li> <li>- Preparation and interpretation of blood smears</li> <li>- Critical evaluation of the results and the method adopted.</li> </ul>
Course books/Bibliography	Liquori G.E. et al. - Tecniche istochimiche ed ultrastrutturali-Schede- Waveng Ed., Bari.
Notes	
Teaching methods	Lectures with the use of Power Point and Lab practices.
Assessment methods (indicate at least the type written, oral, other)	Oral exam
Evaluation criteria (Explain for each expected learning outcome what a student has to know, or is able to do, and how many levels of achievement there are	<p><i>Knowledge and understanding:</i> students should demonstrate good knowledge about each topic and the ability of connecting the different parts of the program. Memorizing without understanding is meaningless.</p> <p><i>Applying knowledge and understanding/Making informed judgements and choices:</i> appropriate descriptions apart, students should focus about morpho-functional, evolutionary, and adaptive aspects of the organs and systems described. They should demonstrate understanding about the interactions between the biological structures and the environmental features.</p> <p><i>Communicating knowledge and understanding</i> students should use correct technical terms in describing structures and processes and explain them when required. Simple drawings made during the examination to better explain the topics are appreciated.</p> <p><i>Capacities to continue learning:</i> although the suggested textbooks cover the topics as much as possible, research is always in progress so some updates will be given during the lessons. The ability of students to integrate these contents with those from the</p>

	textbooks will be evaluated.
Further information	