

General Information	<b>MASTER DEGREE IN BIOLOGY</b>		
Title of the subject	Histological and histochemical techniques		
Degree Course (class)	Cellular and Molecular Biology LM/6		
ECTS credits	6		
Compulsory attendance	YES		
Language	Italian		
Academic year	2020/21		

Subject Teacher		
Name and Surname	Maria Mastrodonato	
email address	maria.mastrodonato@uniba.it	
Place and time of reception	Every day agree with the teacher. It is recommended to contact the teacher by e-mai	
ECTS credits details	Discipline sector (SSD)	Area
	BIO/06	05

Study plan schedule	Year of study plan		Semester	
	II	II		
Time management	Lessons	Laboratory	Exercises	Total
CFU	5	1		6
Total hours	125	25		150
In-class study hours	40	12		52
Out-of-class study hours	85	13		98

### Syllabus

Prerequisites / Requirements	Knowledge of cytology and histology, inorganic and organic chemistry
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#### Expected learning outcomes (according to Dublin descriptors)

Knowledge and understanding	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.
Applying knowledge	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.
Making informed judgments and choices	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.
Communicating knowledge	The student should be able to express himself competently on topics

	related to the histological and histochemical and ultrastructural techniques, demonstrating good communication skills.
Capacities to continue learning	The student should be able to relate competently with morpho-functional approach to the cell and animal tissues
<b>Study Program</b>	
Content	<p>Light microscopy techniques. Structure and use of different types of microscopes(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.</p> <p>Staining protocols. Histomorphological staining methods (e.g. Haematoxilyn-eosin, Masson's Trichrome, Azan-Mallory)</p> <p>Histochemical staining methods (e.g. Feulgen, Methyl green, PAS, Alcian Blu, Alcian Blue-PAS, Toluidine Blue, Oil Red O, SudanN).</p> <p>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.</p> <p>Avidin-biotin technique. Immunoperoxidase and immunophosphates techniques. 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>
Bibliography and textbooks	Liquori G.E. et al. - Tecniche istochimiche ed ultrastrutturali-Schede-Waveng Ed., Bari.
Notes to textbooks	
Teaching methods	Lectures with the use of Power Point and Lab practices.
Assessment methods (oral, written, ongoing assessment)	Oral
Evaluation criteria (describe criteria for each of the above expected outcomes)	<p>Knowledge and understanding: 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>Applying knowledge and understanding/Making informed judgements</p>

	<p>and choices: 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>Communicating knowledge and understanding 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>Capacities to continue learning: 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.</p> <p>The ability of students to integrate these contents with those from the textbooks will be evaluated.</p>
Further information	