<table>
<thead>
<tr>
<th>SUBJECT:</th>
<th>Techniques in Histopathology</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECTS:</td>
<td>3.0</td>
</tr>
<tr>
<td>COORDINATORS:</td>
<td>José García Valero</td>
</tr>
<tr>
<td></td>
<td>Gustavo Egea Guri</td>
</tr>
<tr>
<td>STAFF:</td>
<td>Marta Barrachina Castillo (Fac. Medicina, Universitat de Barcelona)</td>
</tr>
<tr>
<td></td>
<td>Mercè Durfort i Coll (Fac. Biologia, Universitat de Barcelona)</td>
</tr>
<tr>
<td></td>
<td>Gustavo Egea Guri (Fac. Medicina, Universitat de Barcelona) [COORDINATOR]</td>
</tr>
<tr>
<td></td>
<td>José Garcia Valero (Fac. Biologia, Universitat de Barcelona) [COORDINATOR]</td>
</tr>
<tr>
<td></td>
<td>Juan Francisco Montes Castillo (Fac. Biologia, Universitat de Barcelona)</td>
</tr>
<tr>
<td></td>
<td>José Francisco Ramírez Ruz (Fac. Medicina, Universitat de Barcelona i Servei d'Anatomia Patològica, Hospital Clínic i Provincial de Barcelona)</td>
</tr>
</tbody>
</table>

**SUBJECT SCOPE AND OBJECTIVES**

**Subject scope**

The progress in basic biomedical knowledge is having immediate consequences on the characterization of the dysfunctions at the molecular, cellular and tissue levels. This results in the design of new molecules and the improvement of both the experimental protocols and the progress in the scientific instruments used in research and diagnosis.

This subject aims to provide Biomedicine postgraduate students with the knowledge necessary for the professional practice of Medicine and Pharmacy (pathology, clinical analyses, diagnostic methods and therapeutic strategies, among others), as well as basic research (Ph.D. studies, for example) and applied research (pharmaceutical industries, clinical research, etc.).

**Learning objectives**

At the end of the course, the student will achieve the following learning outcomes:

a. To acquire the conceptual basis of techniques used in the study of histopathology.

b. To assimilate the methodological strategies applied in characterizing the pathological patterns at molecular, cellular and tissue levels.

c. To acquire the knowledge to study the pathological patterns by characterizing different *in vivo* and *in vitro* experimental models at molecular, cellular and tissue levels.

d. To acquire technical knowledge about the equipment used in Histopathology (conceptual basis, application, operation and methodology to interpret the results).

e. To know the main sources of histopathological information.

**LECTURES**
Lecture topics

Lectures (20 hours) are distributed among 10 h of basic topics and 2 h of seminars given by specialists in histopathological methodologies.

1. Sampling processing


2. Topographic staining


3. Histochemical techniques


4. Methods for studying systems and organs


5. Immunohistochemical and histochemical techniques


6. PCR and Real Time PCR

DNA and RNA amplification techniques. Parameters affecting the implementation of PCR. PCR instruments. Results analysis. Technical bases of RT-PCR. Instruments, monitoring, sources of error and analysis of results. Competitive RT-PCR. Quantitative RT-PCR. Semiquantitative RT-PCR.

7. In situ hybridization techniques


8. Microarrays


9. Laser microdissection

10. Structure quantification.
Stereology. Image Analysis. Basic equipment used in Histology and Anatomical Pathology

PROGRAM OF SEMINARS

Seminar #1. To be announced.
Seminar #2. To be announced

PRACTICAL SESSIONS

Each student will do two practical sessions totalling 10 hours.

Session #1. Structure quantification. Stereological applications.
Session #2. Immunohistochemical diagnostics.

TEACHING METHODOLOGY AND ORGANIZATION

Lectures
Theoretical lectures. These will last 120 min approximately with the technical support of PC and video.
Practical lectures. These will be given in the laboratory #22 of the faculty of Biology. This lab is supplied with all the necessary material (reagents and small equipment).

Personal homework
It is also necessary to carry out personal homework under the supervision of the coordinators. This work will be composed of the following:
   a. The students should resolve a practical case.
   b. There will also be a part of bibliographical research of some specific item indicated in the programme of the course. This work will be performed by each student.

Study activities
Each student should dedicate enough time to study the content given in the lecture sessions. The course is divided into several classes, whose content will be detailed in the Virtual Campus. At the same time, the student should prepare strategies and study methodologies that help him to get the aims of the course.

Tutorials
The supervisors will attend to requests related with the subject made by the students. This could be done personally (according to the availability of the different teachers) or through the open forum in the Virtual Campus.

EVALUATION

Both the theoretical and practical skills obtained by the student will be evaluated. The evaluation will also take into account the homework performed by the student.
The final score will be the following:

a) 60% of the final score will be obtained after taking an exam. It will be composed of 25 multiple-choice questions. To pass the exam it is necessary to obtain a minimum of 15 correct answers out of 25. There is no negative score if the question is not or incorrectly answered.
b) 40% of the final score will be obtained after evaluation of the student homework indicated above.

**BIBLIOGRAPHY**

There is not a unique bibliographical source that includes all the different items of the course. Therefore, different Cell Biology, Histology and pathology textbooks will be used, as well as web pages, which altogether will be indicated at the end of each lesson.