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**COURSE: Techniques of microscopy and cell culture**

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**ACADEMIC YEAR: 2016-2017**

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**TYPE OF EDUCATIONAL ACTIVITY: (Basic, Characterizing, Affine, Free choice, Other) Free choice**

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**TEACHER: Prof. Raffaele BONI**

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**e-mail: raffaele.boni@unibas.it****website:**<http://scienze.unibas.it/site/home/dipartimento/personale/docente/articolo1000700.html>

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**phone: +39 0971 205017****mobile (optional): +39 320 4371201**

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**Language: ITALIAN**

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**ECTS: 6 (4 lessons  
& tutorials/2  
practice)****n. of hours: 56 (32h  
lessons e  
tutorials/24h  
practice)****Campus: Potenza  
Dept. Sciences:  
BIOTECHNOLOGY (L2)****Semester: I**

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**EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES**

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This course is aimed to train students in the use of optical, electronic, fluorescent and laser confocal microscopy techniques as well as in setting, administering, and using both primary, secondary and continuous cell line cultures. In particular, the knowledge of the different microscopy techniques will be developed through (1) an introduction to the theoretical principles behind each of them; (2) the technical description of the equipment; (3) detailed information on treatments required for the preparation of samples for microscopic investigation (fixation, dissection, staining techniques); (4) image analysis.

The part on cell cultures aims to (1) introduce the basic principles of the technology of cell cultures and show some specific and advanced applications; (2) acquiring skills on design and instrumentation of a laboratory of cell culture; (3) outline the main types of cell culture; (4) define the environmental requirements for the cell culture; and (5) describe cell storage by cryopreservation.

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**PRE-REQUIREMENTS**

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None

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**SYLLABUS**

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Principles of microscopic analysis

Optical microscopy: preparation and evaluation of biological samples

Fluorescence microscopy: preparation and evaluation of biological samples

Confocal laser microscopy: preparation and evaluation of biological samples

Electron microscopy: preparation and evaluation of biological samples

Image analysis

Basic techniques of cell culture, suspension and monolayer cultures, 3D culture

Quality Control

Protocols for the evaluation of cell proliferation and cell viability

Preparation and storage of culture media

Cryopreservation and storage of cells

Cytotoxicity assay and vitality

Culture of cell lines

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**TEACHING METHODS**

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Theoretical lessons, Classroom and Laboratory tutorials.

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**EVALUATION METHODS**

Oral examination

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**TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL**

*Class material.*

*Bruce Alberts: Biologia molecolare della cellula. Zanichelli ed.*

*Introduzione alle colture cellulari, Mariotti GL et al., Tecniche Nuove, 2010*

*Culture of Animal Cells: A Manual of Basic Technique. R. Ian Freshney, Wiley-Liss, 2000.*

*Animal Cell Culture: A Practical Approach. John R. W. Masters, Oxford University Press, 2000.*

*Animal Cell Culture and Technology. Mike Butler, Michael Butler, Taylor & Francis, Inc., 2004.*

*Additional on-line material will be shared after approval by the teacher.*

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**INTERACTION WITH STUDENTS**

*At the beginning of the course, after describing the objectives, the program and the verification procedures, the teacher collects the names and the e-mail addresses of the students. It is a task of the teacher to build a mail-list with which invite students to log in to one of the educational material sharing site, which will be available from the end of the first lesson. Such material can be enriched with in-depth material on the basis of specific needs required by the course.*

*Weekly reception*

| <b>day</b>       | <b>from</b>  | <b>to</b>    | <b>at</b>             |
|------------------|--------------|--------------|-----------------------|
| <i>Tuesday</i>   | <i>16:30</i> | <i>18:30</i> | <i>Teacher's room</i> |
| <i>Wednesday</i> | <i>16:30</i> | <i>18:30</i> | <i>Teacher's room</i> |
| <i>Thursday</i>  | <i>9:30</i>  | <i>11:30</i> | <i>Teacher's room</i> |

*This schedule may be changed due to teaching or academic duties. However, in addition to the scheduled weekly reception, the teacher is always available, when present in his room or lab, for personalized explanations with students, which may be done either by the students receiving as well as by email or phone service.*

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**EXAMINATION SESSIONS (FORECAST)<sup>1</sup>**

*18/01/2017, 09/02/2017, 23/02/2017, 16/03/2017\*, 13/04/2017\*, 04/05/2017, 08/06/2017, 06/07/2017, 21/09/2017, 19/10/2017\*, 09/11/2017\*, 21/12/2017.*

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**SEMINARS BY EXTERNAL EXPERTS**    YES ☒    NO ☐

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**FURTHER INFORMATION**

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<sup>1</sup> Subject to possible changes: check the web site of the Teacher or the Department/School for updates.