Cellular and Molecular Biophysics
a.a 2018/19

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- Moodle web site for Cellular and Molecular Biophysics

http://biologia.i-learn.unito.it/course/view.php?id=638

PROGRAM for both Industrial Biotechnology and Physic

01.10.18 - 05.10.18: Cell membrane permeability: fluxes across the plasma membrane. Transporters classification

Fluxes and lows for neutral species and electrolytes

Fick

Nernst-Plank

Goldman-Hodgkin-Katz

08.10.18 - 12.10.18 : Electrical properties of cell membranes. Action Potential. Patch clamp technique

15.10.18 - 19.10.18 : Ion channels: Structure and function

26.10.18 – 29.10.18: Introduction to fluorescence and fluorophores. Bioimaging techniques using fluorescent probes: FRET, FRAP, TIRF

02.11.18: Seminar Dr. Gkika (instead of 2h teaching). **OPTIONAL for Physic students**

05.11.18: Functional analyses of ion channels: fluorescent probes to measure Ca2+ signals

09.11.18 – 12.11.18: Intracellular messengers: Ca2+ and cAMP and their crosstalk in live cells

16.11.18 - 19.11.18:

Mechanosensitive channels. Two examples: Piezo and TRP **OPTIONAL for Physic students**

23.11.18:

Cell volume regulation and Aquaporin **OPTIONAL for Physic students**

Practical course starting from 20.11.18 to 07.12.18:

See schedules. 5 groups

Ca2+ imaging experience. (extracellular buffer; cell culture; Ca2+ imaging using fluorescent probes); data analyses

PROGRAM for Physic = 1-2 Additional CFU

1 CFU: Students research assay and Mini "workshops". Dates to be decided (January for mini workshop?)

Research Assay: at-home assignment referred to specific topics of the course will be prepared by groups (students) and presented orally by the end of the semester (10' exposition + 5' discussion). Correspondence between vote to the Research Essay and points for final exams is as follows: 22-23, 2 points; 24-25, 6 points; 26-27, 8 points; 28-30, 12 points

1 CFU: practical work in our laboratory. To be defined.

Exam evaluation For Industrial Biotechnology students

Examinations will be based on material covered in lectures, on site activities and assigned assays on practical activities.

- **Practical work**: students will perform specific experiments concerning selected topics presented in the lectures including data analyses. The outcome of the work will be presented in form of final report (Practical Report) that will be part of the final evaluation. Correspondence between vote to the Practical report and additional points for final exams is as follows: **22-23, 4 points; 24-25, 8 points; 26-27, 12 points; 28-30, 16 points.**
- **Final exam** – This exam will be an oral exam based on the topics presented during the course. **The maximum grade will be 16/30.** Grading 31-32 will give rise to " 30 cum laude"

Exam evaluation For Physic students

Examinations will be based on material covered in lectures, on site activities and assigned assays on practical activities.

- **Practical work**: students will perform specific experiments concerning selected topics presented in the lectures including data analyses. The outcome of the work will be presented in form of final report (Practical Report) that will be part of the final evaluation. Correspondence between vote to the Practical report and additional points for final exams is as follows: **22-23, 2 points; 24-25, 6 points; 26-27, 10 points; 28-30, 14 points.**
- **Research Assay**: This at-home assignment will refer to specific topics of the course. The essay (up to 2000 characters + figures, tables and references) will be prepared by groups of usually two students and presented orally by the end of the semester. The Research Essay will give rise to a **maximum of 12/30 points**.

- **Final exam** – This exam will be an oral exam based on the topics presented during the course. **The maximum grade will be 6/30**. Grading 31-32 will give rise to " 30 cum laude"

Research assays organization for Physics Students

- **By 15.10.18:** topics proposal in moodle
- **By 30.10.18:** topic choice and group composition = by mail
- **By 15.11.18**: first meeting (30') to present the outline and work partitions within the groupwork
- **By 15.12.18:** second meeting (30') to check the work in progress
- **01.01.19:** Deadline for research assay
- **january (between 7 and 16):** Mini workshops (10'+5' discussion). Research assay: (up to 2000 characters + figures, tables and references)