



# Neurophysiology

## a.a 2017/18

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- Moodle web site for Neurophysiology:
  - Cohort 2016/semester 3

<http://cmb.i-learn.unito.it/course/index.php?categoryid=28>

# PROGRAM

**02.10.17 - 06.10.17** : Cell membrane permeability: fluxes across the plasma membrane. Transporters classification

Fluxes and laws for neutral species and electrolytes

Fick

Nernst-Planck

Goldman-Hodgkin-Katz

**09.10.17**: A modern classification of transporters and pumps. Functional roles. Ion channels: classification, structural and functional properties.

**13.10.17 - 16.10.17**: Ion channels: Structure and function

**20.10.17 - 23.10.17 - 27.10.17**: Electric Excitability of the cells. Action Potential. Hodgkin and Huxley's analyses of the squid giant axon. Amplitude and frequency coding.

Postsynaptic and receptor potentials.

**30.10.17**: How to study ion fluxes through plasmamembrane and intracellular membranes? Electrophysiology: history and techniques. Patch clamp. Calcium imaging

**03.11.17** : **NO TEACHING**

**6.11.17 - 10.11.17**: Synaptic transmission: presynaptic mechanisms; Ca<sup>2+</sup> and transmitters release; postsynaptic mechanisms

**13.11.17 - 17.11.17**: Genetic approaches to control neural living cells: OPTOGENETIC, CHEMOGENETIC and MAGNETOGENETIC

**20.11.17 - 11.12.17 - 15.12.17**: Cellular bases of sensory physiology: role of TRP channels

**From 21.11.17 to 07.12.17**: I **CFU Prof Buffo**. Physiology of photoreceptors. Receptive fields of visual neurons. Retinotopic maps and columnar organization of the visual cortex. Principles of motion perception and color vision.

**Students research essay Mini "workshops". Dates to be decided (January for mini workshop?)**

# Exam evaluation

- **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, 3 points; 24-25, 6 points; 26-27, 9 points; 28-30, 12 points.
- **Oral exam** based on the topics presented during the course. The maximum grade will be 20/30.
- Grading 31-32 will give rise to “ 30 *cum laude*”

# Research essays organization

- **By 15.10.17:** topics proposal in moodle
- **By 30.10.17:** topic choice and group composition = by mail
- **By 15.11.17:** first meeting (30') to present the outline and work partitions within the groupwork
- **By 15.12.17:** second meeting (30') to check the work in progress
- **08.01.18:** Deadline for research essay
- **Week january 15-19:** Mini workshops (10'+5' discussion). Research essay: (up to 2000 characters + figures, tables and references)