PHYG 7310 - Principles of Electronics for Life Sciences

Credit Hours: 3

Course Goals

The course intends to give students a foundation in the basic principles of electricity and their use in electronics in relation to electrophysiological techniques. This course will enable students to explore and discuss how principles of electronics that have been used to further our understanding of physiology. It will provide a background to understand monitoring of different types of electrical signals. The students will also have the ability to research related literature to their research project/interest in line with the expectations of this course (or research an assigned topic selected in consultation with the course lead).

Course Goal & Learning Objectives

Following this course, students should be able to:

1) Explain basic electronics principles, definitions, Ohm's law
2) Explain basic circuit components, function.
3) Explain the use of equipment for measuring electronic circuit output.
4) Explain electrical signal processing concepts, such as filtering, amplifying, digitizing.
5) Apply the electrical signal processing concepts to a pipeline to design data collection for various electrophysiological signals collected in biological experiments.
6) Identify & evaluate the key methods incorporating electrophysiological signal detection.
7) Identify a topic of interest in electrophysiological signal collection and write a paper about methodological considerations from an electronics/ biological signal-processing perspective).

Class Times & Days of Week:	**Weekly, 3hrs** Fall 2022 – proposed Mondays or Fridays 1-4:50 pm **lecture ~1.5 hrs followed by lab** (or lab to be completed before the next lecture) – to be confirmed after identifying registrants
Location for classes/labs/tutorials:	partially online Zoom /within UM Learn & in room BMSB 409 lab
Pre-Requisites:	basic graduate 3000 level or higher Biology and/or Physics/Chemistry (recommended for PhD level students)
Instructor(s) Name:	Katinka Stecina, Ph.D. & Jeremy Chopek, Ph.D.

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