

## **CoPGr CURRICULAR CHAMBER SUBJECTS PRESENTATION FORM**

SUBJECT'S ACRONYM: **RNP5735**

SUBJECT'S NAME: Advanced Topics in Epileptology

CURRICULUM/AREA: Neurology/17140

FOCAL AREA: Neurology

INITIAL VALIDITY (Year/Semester):

N. OF CREDITS: 02

Theoretical Classes: 05      Practical Classes, Seminars and Others: 01      Hours of Study: 04  
DURATION IN WEEKS: 03

PROFESSOR(S) IN CHARGE:

USP Professor, n. 1076212 – João Pereira Leite

External Professor, n. USP 3012322 – Tonicarlo Rodrigues Velasco

ACTUAL COSTS OF THE SUBJECT: BRL (Presenting, if applicable, the budget foreseen for the year, as an attachment)

### **PROGRAM**

OBJECTIVES:

Making easier the transference of conceptual and practical knowledge on sophisticated and contemporary methodologies; offering opportunities so that the students enrolled (and consequently their respective groups of research) discuss and elaborate international cooperation strategies aiming the technological innovation in neurosciences.

JUSTIFICATION:

Each cubic millimeter of a mammal's brain contain hundred of thousands of nervous cells connected by billions of synapses which operate with temporal accuracy of milliseconds. Such complexity gives to scientists a high motivation so that this "intriguing and mysterious universe" is, at least in part, elucidated. However, this also requires an enormous effort in technological development, so that this search results in advances to the society. In the last twenty-five years different tools were developed for the structural, molecular and functional investigation of the brain. In this subject we will discuss the applications and limitations of new technologies for the research in Neurosciences.

CONTENT (SYLLABUS):

Electrophysiological registers with high density electrodes. Large scale registers offer the opportunity of assessing how the brain generates perceptions, thoughts and actions. In fact, recent works show that the electrophysiological registers with high density electrodes brought significant advances to the fields of memory neurobiology, sleep and psychiatric disorders models. Computer methods for processing biological signals. More recent works have successfully used combined implants of multielectrode matrices with tungsten or nickel-chrome wires, or also of silicon probes for recording large neurons populations in the central nervous system of rodents, primates and non-humans. However, so that the entire potential of these registration systems to be reached, computer methods for processing the signal collected are also necessary. Computer methods for optimizing and automatizing such process are each time more necessary, specially in case of large scale electrophysiological registers. Optogenetics. Method enabling accurate space-time control of the neuronal activity, overcoming the space imprecision of the electric stimulation and the time inaccuracy of the pharmacological activation. In the last

five years, such tool has brought valuable contributions to the studies of learning and memory mechanisms, sleep, social interaction, anxiety, depression, among others.

**EVALUATION CRITERIA:**

Frequency

Report presentation

**NOTES:**