SYLLABUS

1. Information regarding the program

1.1 Higher education institution	**"Babeș-Bolyai" University Cluj-Napoca**
1.2 Faculty	**Faculty of Biology and Geology**
1.3 Department	**Biology and Ecology Department of Hungarian Line**
1.4 Field of study	**Biology**
1.5 Study cycle	**2 years, with frequency**
1.6 Study programme / Qualification	**Medical Biology/Master of Medical Biology**

2. Information regarding the discipline

2.1 Name of the discipline	**Neurophysiology**						
2.2 Course coordinator	**dr. Magor Lőrincz, Associate Professor**						
2.3 Seminar coordinator	**dr. Magor Lőrincz, Associate Professor**						
2.4. Year of study	**I.**	2.5 Semester	**2.**	2.6. Type of evaluation	**E**	2.7 Type of discipline	**Ob.**

3. Total estimated time (hours/semester of didactic activities)

3.1 Hours per week	4	Of which: 3.2 course	2	3.3 seminar/laboratory	2
3.4 Total hours in the curriculum	154	Of which: 3.5 course	28	3.6 seminar/laboratory	28
Time allotment:					hours
Learning using manual, course support, bibliography, course notes					42
Additional documentation (in libraries, on electronic platforms, field documentation)					30
Preparation for seminars/labs, homework, papers, portfolios and essays					22
Tutorship					0
Evaluations					4
Other activities:					-

3.7 Total individual study hours	98
3.8 Total hours per semester	154
3.9 Number of ECTS credits	6

4. Prerequisites (if necessary)

4.1. curriculum	
4.2. competencies	

5. Conditions (if necessary)

5.1. for the course	Course room with laptop, with video projector and with necessary software (Power Point, Word), multimedia appliances, Internet
5.2. for the seminar /lab activities	Laboratory room - mounted properly: laboratory apparatus and materials (centrifuges, thermostat, electrophoretic apparatus, spectrophotometer, thermocycler). The laboratory equipment and material are ensured for use by the Faculty of Biology and Geology.

6. Specific competencies acquired

Professional competencies	• Cognition, understanding and acquirement of the advanced concepts, theories and methods of biology as well as the adequate use of them in the professional communication. • Acquiring basic concepts of neuronal function
Transversal competencies	• Ability of working in groups of life sciences researchers, ability of resolving problems and making decisions, organization of activities in a group.

7. Objectives of the discipline (outcome of the acquired competencies)

7.1 General objective of the discipline	• Throughout the course the students will become familiar with basic concepts of neuronal function
7.2 Specific objective of the discipline	• Acquiring basic concepts of neuronal function

8. Content

8.1 Course	Teaching methods	Remarks
Introduction: Basic structure of the nervous system. Bibliography: Larry R. Squire , Darwin Berg: Fundamental Neuroscience, Third Edition, Academic Press, 2008	• Interactive exposure • Explanation • Conversation • Didactical demonstration	2 hours
Methods in neuroscience. Bibliography: Larry R. Squire , Darwin Berg: Fundamental Neuroscience, Third Edition, Academic Press, 2008	• Interactive exposure • Explanation • Conversation • Didactical demonstration	2 hours
The resting membrane potential. Bibliography: Larry R. Squire , Darwin Berg: Fundamental Neuroscience, Third Edition, Academic Press, 2008	• Interactive exposure • Explanation • Conversation • Didactical demonstration	2 hours
The action potential. Bibliography: Larry R. Squire , Darwin Berg: Fundamental Neuroscience, Third Edition, Academic Press, 2008	• Interactive exposure • Explanation • Conversation • Didactical demonstration	2 hours
Synaptic neurotransmission 1: the neuromuscular junction. Bibliography: Larry R. Squire , Darwin Berg: Fundamental Neuroscience, Third Edition, Academic Press, 2008	• Interactive exposure • Explanation • Conversation • Didactical demonstration	2 hours
Synaptic neurotransmission 2: excitatory and inhibitory synapses.	• Interactive exposure	2 hours

Bibliography: Larry R. Squire , Darwin Berg: Fundamental Neuroscience, Third Edition, Academic Press, 2008	• Explanation • Conversation • Didactical demonstration	
Synaptic neurotransmission 3: presynaptic elements Bibliography: Larry R. Squire , Darwin Berg: Fundamental Neuroscience, Third Edition, Academic Press, 2008	• Interactive exposure • Explanation • Conversation • Didactical demonstration	2 hours
Synaptic neurotransmission 4: postsynaptic elements. Bibliography: Larry R. Squire , Darwin Berg: Fundamental Neuroscience, Third Edition, Academic Press, 2008	• Interactive exposure • Explanation • Conversation • Didactical demonstration	2 hours
Synaptic neurotransmission 5: synaptic plasticity. Bibliography: Larry R. Squire , Darwin Berg: Fundamental Neuroscience, Third Edition, Academic Press, 2008	• Interactive exposure • Explanation • Conversation • Didactical demonstration	2 hours
Synaptic neurotransmission 6: neuronal networks. Bibliography: Larry R. Squire , Darwin Berg: Fundamental Neuroscience, Third Edition, Academic Press, 2008	• Interactive exposure • Explanation • Conversation • Didactical demonstration	2 hours
Neuromodulation. Bibliography: Larry R. Squire , Darwin Berg: Fundamental Neuroscience, Third Edition, Academic Press, 2008	• Interactive exposure • Explanation • Conversation • Didactical demonstration	2 hours
Cortical functions 1. Bibliography: Larry R. Squire , Darwin Berg: Fundamental Neuroscience, Third Edition, Academic Press, 2008	• Interactive exposure • Explanation • Conversation • Didactical demonstration	2 hours
Cortical functions 2. Bibliography: Larry R. Squire , Darwin Berg: Fundamental Neuroscience, Third Edition, Academic Press, 2008	• Interactive exposure • Conversation • Explanation • Didactical demonstration	2 hours
The thalamocortical system. Bibliography: Larry R. Squire , Darwin Berg: Fundamental Neuroscience, Third Edition, Academic Press, 2008	• Interactive exposure • Conversation • Explanation • Didactical demonstration	2 hours
Bibliography Optional bibliography: *Kandel ER, Schwartz JH, Jessell TM: Principles of Neural Science, 4th edition, McGraw-Hill, 2000*		
8.2 Seminar / laboratory	Teaching methods	Remarks
Introduction: Basic structure of the nervous system. Bibliography: DeFelipe J, Jones EG: Santiago Ramón	Interactive exposure. Conversation.	2 hours

y Cajal and methods in neurohistology (1992) Trends Neurosci. 15(7):237-46		
Methods in neuroscience. Bibliography: Neher E, Sakmann B: Single-channel currents recorded from membrane of denervated frog muscle fibres (1976) Nature 260(5554):799-802	Interactive exposure. Explanation Conversation. Experimental Demonstration.	2 hours
The resting membrane potential. Bibliography: Hodgkin AL, Huxley AF: Resting and action potentials in single nerve fibres (1945) J Physiol 104(2):176-95	Interactive exposure. Explanation Conversation. Experimental Demonstration.	2 hours
The action potential. Bibliography: Hodgkin AL, Huxley AF: Resting and action potentials in single nerve fibres (1945) J Physiol 104(2):176-95	Interactive exposure. Explanation Conversation. Experimental Demonstration.	2 hours
Synaptic neurotransmission 1: the neuromuscular junction. Bibliography: Fatt P, Katy B (1951) An analysis of the end-plate potential recorded with an intracellular electrode (1951) J Physiol 115(3):320-70	Interactive exposure. Explanation Conversation. Experimental Demonstration.	2 hours
Synaptic neurotransmission 2: excitatory and inhibitory synapses. Bibliography: Coombs JS, Eccles JC, Fatt P (1955) The specific ionic conductances and the ionic movements across the motoneuronal membrane that produce the inhibitory post-synaptic potential. J Physiol 130(2):326-74	Interactive exposure. Explanation Conversation. Experimental Demonstration.	2 hours
Synaptic neurotransmission 3: presynaptic elements Bibliography: Constance Hammond: Cellular and Molecular Neurophysiology, Third Edition, Third Edition, Academic Press, 2008 Larry R. Squire, Darwin Berg: Fundamental Neuroscience, Third Edition, Academic Press, 2008	Interactive exposure. Explanation Conversation. Experimental Demonstration.	2 hours

Synaptic neurotransmission 4: postsynaptic elements Bibliography: Constance Hammond: Cellular and Molecular Neurophysiology, Third Edition, Third Edition, Academic Press, 2008 Larry R. Squire, Darwin Berg: Fundamental Neuroscience, Third Edition, Academic Press, 2008	Interactive exposure. Explanation Conversation. Experimental Demonstration.	2 hours
Synaptic neurotransmission 5: synaptic plasticity. Bibliography: Constance Hammond: Cellular and Molecular Neurophysiology, Third Edition, Third Edition, Academic Press, 2008 Larry R. Squire, Darwin Berg: Fundamental Neuroscience, Third Edition, Academic Press, 2008	Recovery of practical work	2 hours
Synaptic neurotransmission 6: neuronal networks. Bibliography: Constance Hammond: Cellular and Molecular Neurophysiology, Third Edition, Third Edition, Academic Press, 2008	Practical exam	2 hours
Neuromodulation Bibliography:		
Cortical functions 1. Bibliography: McCormick DA, Connors BW, Lighthall JW, Prince DA: (1985) Comparative electrophysiology of pyramidal and sparsely spiny stellate neurons of the neocortex. J Neurophysiol. 54(4):782-806		
Cortical functions 2. Bibliography: Steriade M, Nuñez A, Amzica F (1993) A novel slow (< 1 Hz) oscillation of neocortical neurons in vivo: depolarizing and hyperpolarizing components. J Neurosci. 13(8):3252-65		
The thalamocortical system Bibliography: Steriade M, Contreras D, Curró Dossi R, Nuñez A (1993) The slow (< 1 Hz) oscillation in reticular thalamic and thalamocortical neurons: scenario of sleep rhythm generation in interacting thalamic and neocortical networks. J Neurosci 13(8):3284-99 Hughes SW, Cope DW, Blethyn KL, Crunelli V (2002) Cellular mechanisms of the slow (<1 Hz) oscillation in thalamocortical neurons in vitro. Neuron 33(6):947-58		

Bibliography

Constance Hammond: Cellular and Molecular Neurophysiology, Third Edition, Third Edition, Academic Press, 2008

9. Corroborating the content of the discipline with the expectations of the epistemic community, professional associations and representative employers within the field of the program

The content of the discipline is in accordance with the contents tought in other romanian universities and in foreign countries.

10. Evaluation

Activity type	Evaluation criteria	Evaluation Methods	Portion in the final note
Course	Verification of the theoretical knowledge	Oral test at the end of the semester	80%
Seminar/Laboratory	Verification of the practical knowledge	Oral test at the end of the semester	20%
Minimal standard of the performance			
• Cognition of the basic concepts and principles, the minimal note is 5.			

Date 14.07.2024

Signature of course coordinator

Dr. Magor Lőrincz

Associate Professor

Signature of seminar coordinator

Dr. Magor Lőrincz

Associate Professor

Date of approval

Signature of the head of department

Dr. Keresztes Lujza