



**NEUROENDOCRINE/ENVIRONMENTAL CONTROL OF REPRODUCTION AND CHRONOBIOLOGY IN FISH.  
(AL-FARABI KAZAKH NATIONAL UNIVERSITY)**

**40 hours**

**November 2014 WEEK-1**

Day					
<b>1</b>	T1. Interest of fish as model species	T2. Reproduction: types, tactics and strategies	T3. The reproductive axis: an introduction	T4. Organization of the hypothalamo-pituitary complex in fish	T5. Brain factors influencing gonadotrophin release: Gonadotrophin-releasing hormone (GnRH)
<b>2</b>	T5. Brain factors influencing gonadotrophin release: Gonadotrophin-releasing hormone (GnRH)		T6. Brain factors influencing gonadotrophin release: GnRH receptors	T7. Brain factors influencing gonadotrophin release: Dopamine	T8. Brain factors influencing gonadotrophin release: GABA and NPY
<b>3</b>	T9. Novel brain factors controlling reproduction: kisspeptins	T10. Novel brain factors controlling reproduction: Gonadotrophin inhibitory hormone (GnIH)	T11. The pituitary: synthesis and secretion of gonadotrophins		T12. The gonads: gametogenesis and steroidogenesis
<b>4</b>	T13. The steroid feedback	T14. The steroid feedback: brain aromatization	T15. Interaction of reproduction with other physiological processes	T16. Regulation of sexual behavior	

En coordinación con Aula Universitaria Hispano-Rusa





**NEUROENDOCRINE/ENVIRONMENTAL CONTROL OF REPRODUCTION AND CHRONOBIOLOGY IN FISH  
(AL-FARABI KAZAKH NATIONAL UNIVERSITY)**

**November 2014 WEEK-2**

**40 hours**

<b>Day</b>				
<b>5</b>	T17. Environmental control of reproduction	T18. Cronobiology: basic concepts	T19. The pineal and melatonin secretion	
<b>6</b>	T20. Rhythms of reproduction	T21. Feeding and metabolic rhythms	T22. Chronopharmacology and Chronotoxicity	
<b>7</b>	T23. Developmental chronobiology: the pleuronectiform case	T24. Work in groups. Computer-simulated practical exercises in Chronobiology		
<b>8</b>	T25. The Marine Campus of International Excellence (CEIMAR)	T26. CEIMAR and Aquaculture research	T27. The International Doctorate School in Marine Studies (EIDEMAR).	

En coordinación con Aula Universitaria Hispano-Rusa

