

## REQUIREMENTS

<b>Semmelweis University</b>	Faculty, Department:
<b>Faculty of Medicine, Department of Anatomy, Histology and Embryology</b>	
<b>Name of the course:</b> Systems Neuroscience V. Learning and Navigation	
<b>Type of course:</b> optional course-unit	
<b>code:</b> AOSANT560_5A	
<b>credit:</b> 2	
<b>Name of the responsible person:</b> Dr. Gábor Gerber (Zoltán Somogyvári, PhD)	
<b>Academic year:</b> 2018/2019., second semester	
<b>Role of the course in the training of the Department:</b>  During this course, we will study classical learning theories through artificial neural network models. Learning methods, networks and rules, their capabilities and limitations will be discussed. By applying these theories, high level cognitive functions will be approached. As an example, navigation will be our working horse, a task which should be solved by all moving animals. Thus, the possible navigation strategies, applied by different species, will be reviewed, then the underlying neural structures and activity patterns will be described. Finally, neural models of the navigation (some of them are applicable and actually were applied in robots) will be introduced.	
<b>The program of the course:</b>  1. Lecture: Learning in artificial neural networks I 2. Lecture: Learning in artificial neural networks II 3. Lecture: Learning in artificial neural networks III 4. Lecture: Learning in artificial neural networks IV 5. Lecture: Learning in artificial neural networks V 6. Lecture: Learning in biological neurons and neural networks I 7. Lecture: Learning in biological neurons and neural networks II 8. Lecture: Learning in biological neurons and neural networks III 9. Lecture: Learning in biological neurons and neural networks IV 10. Lecture: Learning in biological neurons and neural networks V 11. Lecture: Navigation strategies I 12. Lecture: Navigation strategies II 13. Lecture: Navigation strategies III 14. Lecture: Navigation strategies IV 15. Lecture: Navigation strategies V 16. Lecture: Biology of navigation I 17. Lecture: Biology of navigation II 18. Lecture: Biology of navigation III 19. Lecture: Biology of navigation IV 20. Lecture: Biology of navigation V 21. Lecture: Students' presentations, discussion I 22. Lecture: Students' presentations, discussion II 23. Lecture: Students' presentations, discussion III 24. Lecture: Written test 25. Lecture: Written test	

**Practical courses:**

1. course: Simple classroom experiments, demonstrating particular properties of human navigation system. I
2. Course: Simple classroom experiments, demonstrating particular properties of human navigation system. II
3. Course: Simple classroom experiments, demonstrating particular properties of human navigation system. III

**Consultations:** personally with the actual course leader

**Requirements of course participation and options to recover missed hours:**

1. Total absence allowed: 10% of the course hours
2. Recovering missing hours: studying the material provided by the course leaders, consultation

**Eligibility:** US grade point average (GPA) of 3.0. Students with a GPA lower than 3.0 should inquire with the Directors on the possibility of a waiver.

**Justification of absence from course hours or exams:**

Hungarian medical certificate

**Number and schedule of the examinations:**

1 on the last day of the course

**Requirements of the successful completion of the program:**

written or oral test in each course material

**Marks:**

In case of a written test grades are given after obtaining points as follows: 0-50% fail, 51-60% pass, 61-75% fair, 76-90% good, above 90% excellent.

**Types of exam:** test, essay, verbal

**Requirements of the examinations:**

Verbal and electronic etc. material provided by the lecturers. Syllabus is available upon opening the program on the web page.

**Registration for exams:** NEPTUN

**Rescheduling the tests:**

N/A

Each student has to take an examination in each block of the course.

**Justification of absence from the exam:**

Hungarian medical certificate (see above).

**List of useful literature (books, papers etc):**

Müller, B and Reinhardt, J (1990) Neural Networks, An Introduction. Springer-Verlag,  
Trullier, O., Wiener, S. I., Berthoz, A., & Meyer, J.-A. (1997). Biologically based artificial navigation  
systems: Review and prospects. Progress in Neurobiology, 51, 483–544.  
Further readings will be made available at <http://cneuro.rmki.kfki.hu/education>