

REQUIREMENTS

Semmelweis University, Faculty of Medicine Name of the managing institute (and any contributing institutes): Department of Anatomy, Histology and Embryology
Name of the subject: Systems Neuroscience I. Systems Biology: Neuronal genomics and proteomics in English: Systems Neuroscience I. Systems Biology: Neuronal genomics and proteomics in German: Credit value: 2 Number of lessons per week: 28 lecture: 0 practical course: 3 seminar: 25 Subject type: compulsory course elective course <u>optional course</u>
Academic year: 2019/2020. academic year II. semester
Subject code: AOSANT560_1A <i>(In case of a new subject, it is filled by the Dean's Office, after approval)</i>
Name of the course leader: Dr. Gerber Gábor His/her workplace, phone number: 53653 Position: Vice Chairman of the dept. Date and registration number of their habilitation: 04/2019
Objectives of the subject, its place in the medical curriculum: The seminar series aims to give a survey on systems biology approach of biological functions. We discuss the high-throughput methods: next generation sequencing, proteomics and mass spectrometry of proteins, and we give a survey of recently developed sophisticated technologies and mathematical analysis of data. We show the problems of single cell transcriptomics and genomics analysing the individual cells in deep sequencing technology. The basis of FDA Controlling Science Initiative and EU recommendation for development of systems biology education, lab work and data processing in health industry.
Place where the subject is taught (address of the auditorium, seminar room, etc.): library room, Department of Anatomy, Histology and Embryology
Successful completion of the subject results in the acquisition of the following competencies:
Course prerequisites: Genetics and genomics, Molecular cell biology and Bioinformatics and genome analysis. Grade point average (GPA) of 3.0 in the last semester.
Number of students required for the course (minimum, maximum) and method of selecting students: min. 5, max. 7; on the first-come first-served basis
How to apply for the course: Neptun
Detailed curriculum:

(Theoretical and practical lessons shall be given separately by numbering the lessons (by weeks). Please provide the names of the teachers of the lectures and practical lessons and indicate guest lecturers. Do not use attachments! Always attach a CV for guest lecturers!)

Gábor Juhász, DS, guest lecturer

Theoretical lessons

1. Seminar: Introduction to systems biology I
2. Seminar: Introduction to systems biology II
3. Seminar: Introduction to systems biology III
4. Seminar: Personalized medicine I

Major trends in medical revolution: Molecular diagnosis biomarkers, non-molecular biomarkers,, telemedicine, new role of internet

5. Seminar: Personalized medicine II

History of personalized medicine, why the real personalization is a dream only, classification paradox in diagnosis, pitfalls in pharma industry and the way of new progress, terranostics and their development

6. Seminar: Changes in view, new interpretation of phenotype I
7. Seminar: Changes in view, new interpretation of phenotype II
8. Seminar: Changes in view, new interpretation of phenotype III
9. Seminar: Changes in view, new interpretation of phenotype IV
10. Seminar: Changes in view, new interpretation of phenotype V
11. Seminar: Methods of genomics and proteomics I
12. Seminar: Methods of genomics and proteomics II
13. Seminar: Methods of genomics and proteomics III
14. Seminar: Methods of genomics and proteomics IV
15. Seminar: Methods of genomics and proteomics V
16. Seminar: Controlling Science I
17. Seminar: Controlling Science II
18. Seminar: Upcoming revolution in medicine I
19. Seminar: Upcoming revolution in medicine II
20. Seminar: Upcoming revolution in medicine III
21. Seminar: Students' presentations, discussion I
22. Seminar: Students' presentations, discussion II
23. Seminar: Students' presentations, discussion III
24. Seminar: Written test
25. Seminar: Written test

Practical lessons:

1. Course: High throughput proteome and genome analyses techniques I
2. Course: High throughput proteome and genome analyses techniques II
3. Course: High throughput proteome and genome analyses techniques III

Consultations: personally with the actual course leader

Other subjects concerning the border issues of the given subject (both compulsory and optional courses!). Possible overlaps of themes:

Special study work required to successfully complete the course:

(E.g. field exercises, medical case analysis, test preparation, etc.)

Requirements for participation in classes and the possibility to make up for absences:

Total absence allowed: 25% of the course hours

Recovering missing hours: studying the material provided by the course leaders, consultation

Methods to assess knowledge acquisition during term time: (E.g. homework, reports, mid-term test, end-term test, etc., the possibility of replacement and improvement of test results) Exam on the last day of the course Additional occasions to be arranged by the teacher for improvement
Requirements for signature: Susccesful written test
Type of examination: colloquium
Requirements of the examination: <i>(In case of a theoretical examination, please provide the topic list; in case of a practical exam, specify the topics and the method of the exam)</i> Verbal and electronic etc. material provided by the lecturers. Syllabus is available upon opening the program on the web page.
Method and type of evaluation: <i>(Method of calculating the final mark based on the theoretical and practical examination. How the mid-term test results are taken into account in the final mark.)</i> Grades are given after obtaining points as follows: 0-50% fail, 51-60% pass, 61-75% fair, 76-90% good, above 90% excellent.
How to register for the examination?: Neptun
Possibilities for exam retake: 2 occasions arranged by the teacher
Printed, electronic and online notes, textbooks, guides and literature (URL address for online material) to aid the acquisition of the material: E. De Schutter (2008). Why are computational neuroscience and systems biology so separate? PLoS Comp. Biology 4: e1000078. Fernald GH, Capriotti E, Daneshjou R, Karczewski KJ, Altman RB. (2011) Bioinformatics Challenges for Personalized Medicine. Bioinformatics 27 (13): 1741-1748. Guidance for Industry. E15 Definitions for Genomic Biomarkers, Pharmacogenomics, Pharmacogenetics, Genomic Data and Sample Coding Categories. U.S. Department of Health and Human Services, Food and Drug Administration, Center for Drug Evaluation and Research (CDER), Center for Biologics Evaluation and Research (CBER), April 2008, International Conference on Harmonisation (ICH). https://www.fda.gov/downloads/drugs/guidancecomplianceregulatoryinformation/guidances/ucm073162.pdf - OMICS in personalised medicine. Workshop to explore the role of -omics in the development of personalised medicine. European Commission, DG Research - Brussels, 29-30 April 2010. https://ec.europa.eu/research/health/pdf/summary-report-omics-for-personalised-medicine-workshop_en.pdf
Signature of the habilitated instructor (course leader) who announced the subject:
Signature of the Director of the Managing Institute:
Hand-in date:

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Opinion of the competent committee(s):
Comments of the Dean's Office:
Dean's signature: