University of Pécs (UP)

Medical School's (MS),
Faculty of Pharmacy's (FP),
ongoing doctoral (PhD) training

optional PhD courses in the 2025-2026 school year

PÉCS

2025

CHOOSABLE PHD COURSES
IN THE 2025-2026
SCHOOL YEAR

The list contains the announced courses of all the accredited programs of the UP MS/FP, sorted by the instructors' names. All PhD students can apply (state scholarship holders, correspondence students and individually preparing students).

The "code number" system is used to identify courses belonging to the same program group, maintaining the order sorted by the names of the leading course instructors. The registry published in the appendix is applicable for the collation of the code numbers and programs.

Detailed descriptions of the PhD courses can be found on the UP MS/FP website https://aok.pte.hu/hu/egyseg/1670/index/almenu/756.

Choosing courses is based on the reconciliation with the topic leaders.

I kindly ask everyone to contact the chosen instructors as soon as possible; you have to come to agreement with them about the details personally. There are no strict class schedules; each instructor comes to terms with each student individually.

Registrations for the courses happen at the course leaders.
Deadline: 12th September 2025.

Dr. Rékási, Zoltán
PhD secretary
(telephone: 36101, 36104, 36103, 31824)

code	instructor in charge	title	credit	host department
OPKI_B-2/2014_ABH1	**Dr. Ábrahám, Hajnalka**	The hippocampus and its role in temporal lobe epilepsy	2	Department of Biology
description	The lectures deal with the role of the hippocampus and the temporal lobe structures connected to it in the epileptogenesis. Lectures will discuss the information, the morphology, connections, development of the hippocampus and the morphological and functional changes of it in temporal lobe epilepsy. Topics include the animal models of temporal lobe epilepsy and on the basis of them developed theories of epileptogenesis.			

Declaration of the course:

Semester: spring
Application deadline: 02. 05.
Application: **name:** Dr. Ábrahám, Hajnalka
telephone: 36216
email: hajnalka.abraham@aok.pte.hu

Maximum number of attending students: 10
Criteria of acceptance in case of overbooking: declaration of acceptance from the leader of the course

Timeframe of education total hours of the course: 14
number of lectures per week: 2

Type of examination: written
Type of remedial exam: written

Criteria of accepting the course (exams, maximum number of absence, etc.).: attendance of 80% of the classes, to reach 70% of the scores and the exam
Opportunities for making up for non-attendance: no

List of resources (book, note, other) **required for learning the curriculum:** we will handle out the relevant literature
Topics and instructors of the activities (all lectures, practices, seminars separately):
Lectures:

1. The anatomy and connections of the hippocampus (dr. Ábrahám Hajnalka)
2. Structure of the archicortex and neocortex (dr. Ábrahám Hajnalka)
3. Prenatal development of the hippocampus (dr. Ábrahám Hajnalka)
4. Postnatal morphological and functional developemnt of the hippocampus. (dr. Ábrahám Hajnalka)
5. Diagnosis, differential diagnosis of the temporal lobe epilepsy. Meisal temporal sclerosis. The role of febrile seizure (dr. Janszky József)
6. Visualisation of hippocampal functions with fMRI. (dr. Janszky József)
7. Morphological changes in the hippocampus in temporal lobe epilepsy I. Cell death (dr. Ábrahám Hajnalka)
8. Morphological changes in the hippocampus in temporal lobe epilepsy II. Synaptic reorganization (dr. Ábrahám Hajnalka)
9. Morphological changes in the temporal archicortex. (dr. Ábrahám Hajnalka)
10. Morphological changes in the temporal neocortex. (dr. Ábrahám Hajnalka)
11. Examination of impairments of verbal memory and spatial navigation. (dr. Karádi Kázmér)
12. Functional changes in temporal lobe epilepsy. (dr. Karádi Kázmér)
13. Animal models of temporal lobe epilepsy. (dr. Ábrahám Hajnalka)
14. Theories of epileptogenesis. Test. (dr. Ábrahám Hajnalka)

code	instructor in charge	title	credit	host department
OPEL_A-138/1993_BAA1	**Dr. Barakonyi, Alíz**	Aseptic Laboratory Techniques, Cell Culture Methods, and the Design of Functional Assays	3	Department Medical Microbiology and Immunology
description	This course is designed to provide students with a solid foundation in aseptic laboratory techniques and a comprehensive understanding of both theoretical and practical aspects of planning and conducting functional assays that require sterile conditions. It offers detailed insight into the maintenance of suspension and adherent cell lines, the implementation of cell culture procedures, and the critical challenges associated with these techniques. Particular focus is given to the practical application of cell lines in functional experiments, as well as to the interpretation of experimental results and the limitations related to data evaluation.			

Declaration of the course:

Semester: spring
Application deadline: 1. February
Application: **name:** Dr. Alíz Barakonyi
telephone: 72/536-001/36262
email: barakonyi.aliz@pte.hu

Maximum number of attending students: 3 persons
Criteria of acceptance in case of overbooking: order of application

Time frame of education total hours of the course: 21
number of lectures per week: 2
number of practices per week: 16
number of seminars per week: 3

Type of examination: oral
Type of remedial exam: oral

Criteria of accepting the course (exams, maximum number of absence, etc.).:
Oral examination at the end of the course
Opportunities for making up for non-attendance:
There is no possibility for a make-up session.

List of resources (book, note, other) **required for learning the curriculum:**
Lecture, seminar, and practical session materials

Topics and instructors of the activities (all lectures, practices, seminars separately):
Lecturer of all lectures, seminars, and practical sessions: Dr. Alíz Barakonyi
Topics of the lectures, seminars, and practical sessions:
Day 1:
Lectures (2):

- Principles of sterile laboratory work
- Cell culture and its types

Practical sessions (4):

- Learning sterile laboratory techniques in a laminar flow box
- Cell culture in practice

Day 2:
Seminars (1):
- In what types of experiments can cell culture techniques be applied? - Functional assays: Principles of experimental design

Practical sessions (4):
- Cell culture in practice
- Laboratory execution of functional assays

Day 3:
Seminars (1):
- What can we conclude from functional assays? - Interpretation of results and principles of data evaluation

Practical sessions (4):
- Cell culture in practice
- Laboratory execution of functional assays

Day 4:
Seminars (1):
- How to publish functional results? - Guidelines and practical advice

Practical sessions (2):
- Cell culture in practice

Day 5:
Practical sessions (2):
- Cell culture in practice

code	instructor in charge	title	credit	host department
OPGY_A-292/1994_BAM1	**Dr. Balaskó, Márta**	Pathophysiological mechanisms of the development, prevention and treatment of obesity.	2	Institute for Translational Medicine
description	The aim of the course is to analyze the regulatory alterations in the background of juvenile and middle-aged obesity observed in humans and other mammals. Obesity-induced long-term regulatory alterations in energy metabolism, pathophysiological mechanisms of preventive and therapeutic methods are discussed. During the course, results of animal studies and human observations are discussed and critically analyzed. In addition to the thorough analysis of the literature, animal experiments regarding the complex study of energy balance, also involving spontaneous physical activity (running wheels) and treadmill training will also be carried out.			

Declaration of the course:

Semester: spring
Application deadline: 01-30th September
Application: **name:** dr. Balaskó, Márta
telephone: +36-72-536-246
email: marta.balasko@aok.pte.hu

Maximum number of attending students: 5-7
Criteria of acceptance in case of overbooking: order of application

Time frame of education total hours of the course: 14 (7 x 2 x 45 min)
number of practices per week: 1
number of seminars per week: 1

Type of examination: oral
Type of remedial exam: oral

Criteria of accepting the course (exams, maximum number of absence, etc.).: 3 x 45 min)
Opportunities for making up for non-attendance: Summarizing essay (2-3 pages) on the topic of the missed seminar or practice

List of resources (book, note, other) **required for learning the curriculum:**
Powerpoint presentations used in the seminars, review articles on the topics
Topics and instructors of the activities (all lectures, practices, seminars separately):
1. Epidemiology and consequences of obesity in humans and in laboratory rodents. Gender differences. Experimental methods of the complex study of energy balance. (Dr. Márta Balaskó)
2. Age-related regulatory alterations in energy balance in diet-induced obese (DIO) and diet-induced obesity-resistant (DR) rodents. Animal models. (Dr. Erika Pétervári)
3. Obesity-induced short- and long-term regulatory alterations in the energy balance in laboratory rodents and humans. Their importance in the development and maintenance of metabolic syndrome. (Dr. Szilvia Soós)
4. The effects of pre- and neo-natal over- or under-nutrition on regulatory processes of energy balance, on peripheral metabolism, on functions of the central nervous system in rodents. Evaluation of human observations. (dr. Márta Balaskó)
5. Methods of prevention and/or treatment of obesity: forms and pathophysiological mechanisms of caloric restriction in rodents and humans. (dr. Erika Pétervári)
6. Methods of prevention and/or treatment of obesity: forms and pathophysiological mechanisms of physical activity in rodents and humans. Experimental methods. (dr. Márta Balaskó).
7. Possible corrections of short-term and long-term obesity-induced peptidergic regulatory alterations in experimental rodent models. Potential future treatment strategies of obesity. (dr. Erika Pétervári)

code	instructor in charge	title	credit	host department
OPEL_B-139/1993_BET1	**Dr. Berki, Tímea**	Laboratory immune techniques in molecular biology research	6	Department of Immunology and Biotechnology
description	The aim of the course is to introduce, at skill level, the main immunological techniques frequently used in molecular biology research. The newest and most important methods will be covered during the 5x8 hours of practice with active participation of the students. Besides the classical cellular immunologic and immunoserologic techniques, the new possibilities in cellular and molecular immunology and modern molecular biological applications will also be introduced.			

Declaration of the course:

Semester: autumn
Application deadline: October 1st
Application: **name:** Erdő-Bonyár, Szabina
telephone: 36288
email: erdo-bonyar.szabina@pte.hu

Maximum number of attending students: 20
Criteria of acceptance in case of overbooking: order of application

Time frame of education total hours of the course: 40
number of practices per week: 5 x 8

Type of examination: written
Type of remedial exam: written

Criteria of accepting the course: active participation in the practices, maximum 3 hours absent
Opportunities for making up for non-attendance: individual make up

List of resources (book, note, other) **required for learning the curriculum:**
Abul K. Abbas: Cellular and Molecular Immunology 9th ed. 2018
Immunology journals

Topics and instructors of the activities (all lectures, practices, seminars separately):
Péter Németh (PN), Péter Balogh (PB), Tímea Berki (TB), Ferenc Boldizsár (FB), Diána Simon (SD), Péter Engelmann (PE), Katalin Böröcz (KB), Szabina Erdő-Bonyár (SZEB), Zoltán Kellermayer Zoltán (ZK), Dávid Ernszt Dávid (DE)

PhD Course schedule:

Monday

Introduction.
Monoclonal and polyclonal antibodies.
Immunization, hybridoma technique.
Antibody purification and storage.
Antibody modifications: radioactive isotope isotope labeling, colloid gold labeling, enzymatic labeling,
fluorescent labeling, avidin-biotin system
Immunocytochemistry, immunohistochemistry, fluorescent microscopy, confocal microscopy
Immunohistochemistry practice.

Tuesday

Haemagglutination, Coombs-test.
Nephelometry, turbidimetry.
ELISA, RIA.
Routine diagnostics, automatization.
Immunodiffusion, immunoelectrophoresis.
Dot blot, Westen blot.
Immunoprecipitation.
ELISA routine diagnostic practice.

Wednesday

Molecular DNA techniques and their immunologic applications I.
Phage display and its applications in immunology.
Molecular biology practice.

Thursday

Significance of cell surface CD markers. Flow cytometry.
Cell surface and intracellular staining for flow cytometry.
New possibilities in flow cytometry.
CBA technique.
Flow cytometry practice.

Friday

Molecular DNA techniques and their immunologic applications II.
Lentiviral vectors.
RNA interference and its application areas.
Consultation
Exam

code	instructor in charge	title	credit	host department
OPEL_B-139/1993_BET2	**Dr. Berki, Tímea**	New trends in molecular and cellular immunology	4	Department of Immunology and Biotechnology
description	The aim of the course is the presentation and discussion of the newest advances and results of immunology, immunobiology and related research areas. Researchers of the			

	department, together with invited lecturers will give weekly seminars where hot topics of immunology will be covered and discussed (e.g. immunological tolerance, recognition of self vs. non-self, physiologic and pathologic autoimmunity, lymphoid cell differentiation in diseases, animal models etc).

Declaration of the course:

Semester: spring
Application deadline: February 14
Application: **name:** Erdő-Bonyár, Szabina
telephone: 36288
email: erdo-bonyar.szabina@pte.hu

Maximum number of attending students: 20
Criteria of acceptance in case of overbooking: order of application

Time frame of education total hours of the course: 28
number of lectures per week: 1
number of seminars per week: 1

Type of examination: oral
Type of remedial exam: oral

Criteria of accepting the course: maximum 3 absences, successful exam
Opportunities for making up for non-attendance: none

List of resources (book, note, other) **required for learning the curriculum:**
Abul K. Abbas: Cellular and Molecular Immunology 9th edition 2018
Immunology journals

Topics and instructors of the activities (all lectures, practices, seminars separately):
The exact schedule with lectures will be announced at the beginning of the semester.
Lecturers: Péter Németh, Péter Balogh, Tímea Berki, Ferenc Boldizsár, Diána Simon, Péter Engelmann, József Najbauer, invited lecturers

code	instructor in charge	title	credit	host department
OPMU_B-130/1993_BUB1	**Dr. Bugyi, Beáta**	Fluorescence microscopic approaches in biological sciences	2	Department of Biology

description	The aim of the course is to provide extensive knowledge for the principles and applications of basic and most advanced fluorescence microscopic approaches used in biological sciences. Special applications and their pros and cons will be discussed. The practicals are designed to gain strong experience in handling modern research microscopes, sample preparation and image analysis.

Declaration of the course:

Semester: spring
Application: **name:** dr. Bugyi, Beáta
telephone: 36216
email: beata.bugyi@aok.pte.hu

Maximum number of attending students: 10
Criteria of acceptance in case of overbooking: order of application

Time frame of education total hours of the course: 14
number of lectures per week: 1
number of practices per week: 1

Type of examination: written
Type of remedial exam: written

Criteria of accepting the course (exams, maximum number of absence, etc.).: No more than 2 absences and successful exam.
Opportunities for making up for non-attendance: Discussed with the course's instructor in charge.

List of resources (book, note, other) **required for learning the curriculum:** The educational material will be provided by the lecturers.

Topics and instructors of the activities (all lectures, practices, seminars separately):
Lectures:
Basics of light microscopy (1 hour)
Fluorescence microscopy (1 hour)
Confocal microscopy (1 hour)
Advanced microscopic approaches: total internal reflection fluorescence microscopy (TIRFM), stimulated emission depletion microscopy (STED), two-photon microscopy, structured illumination microscopy (SIM), single molecule localization microscopy (1 hour)
Advanced microscopic approaches: FRAP, FRET, FLIM (1 hour)
Image analysis (2 hours)
Practicals:
Basics of light microscopy (2 hours)
Advanced microscopic approaches: TIRFM, SIM (2 hours)
Image analysis (3 hours)

code	instructor in charge	title	credit	host department
OPMU_B-130/1993_BUB2	**Dr. Bugyi, Beáta**	Fundamental laboratory mathematics	4	Department of Biology
description	The aim of the course is to provide math skill essential for the laboratory analysis and reduce the anxieties math often induces. The course provides extensive knowledge of the mathematical principles and applications of basic and most advanced laboratory calculations. Case studies and real-world examples are discussed. Special emphasis is led to acquire skills of the use of Excel.			

Declaration of the course:
Semester: autumn
Application: **name:** dr. Bugyi, Beáta
telephone: 36216
email: beata.bugyi@aok.pte.hu

Maximum number of attending students: 10
Criteria of acceptance in case of overbooking: order of application

Time frame of education total hours of the course: 28
number of lectures per week: 2

Type of examination: written
Type of remedial exam: written

Criteria of accepting the course (exams, maximum number of absence, etc.).:
No more than 3 absences and successful exam.

Opportunities for making up for non-attendance: Discussed with the course's instructor in charge.

List of resources (book, note, other) **required for learning the curriculum:**
The educational material will be provided by the lecturers.

Topics and instructors of the activities (all lectures, practices, seminars separately):
1. unit (4 hours) Excel functions
2. unit (4 hours) Algebra, solutions, dilutions
3. unit (4 hours) Functions, graphs, standard curves
4. unit (12 hours) Quality assessment and control, statistical analysis
5. unit (4 hours) Sampling, simulation techniques

Instructors: Dr. Beáta Bugyi, Leipoldné Dr. Andrea Teréz Vig, Dr. Péter Gaszler

code	instructor in charge	title	credit	host department
OPKI-B-3/2014_CZB1	**Dr. Czéh, Boldizsár**	Stress: From molecules to behavior. The biology of stress response, pathological consequences and coping mechanisms.	2	Institute of Laboratory Medicine
description	The presence of stress in our civilized societies is continuously increasing. The aim of this course is to define the concept of stress and to discuss the biology of stress response and it's physiological and psychological consequences. Experiencing traumatic or chronic stress at different periods in our life can have long term consequences on our development and adult health (physical and psychological). We also deal with various somatic and neuropsychiatric disorders that can develop as a consequence of stress. Finally, we discuss and practice potential coping strategies.			

Declaration of the course:

Semester: spring
Application deadline: 1st of February
Application: **name:** Dr Czéh, Boldizsár
telephone: 29151
email: **czeh.boldizsar@pte.hu**

Maximum number of attending students: 12
Criteria of acceptance in case of overbooking: order of application, declaration of acceptance from the leader of the course

Time frame of education total hours of the course: 14
number of lectures per week: 2
number of practices per week: 2 practices at the end of the course
Type of examination: written
Type of remedial exam: oral

Criteria of accepting the course (exams, maximum number of absence, etc.).: The result of the exam should be better than 60%. One can be absent for a maximum of 2 hours.
Opportunities for making up for non-attendance: Self learning.

List of resources (book, note, other) **required for learning the curriculum:**
Lucassen PJ et al.: **Neuropathology of stress. Acta Neuropathol**. 2014 Jan;127(1):109-35. doi: 10.1007/s00401-013-1223-5.
Koolhaas JM et al.: **Stress revisited: a critical evaluation of the stress concept**. Neurosci Biobehav Rev. 2011 Apr;35(5):1291-301. doi: 10.1016/j.neubiorev.2011.02.003.
Robert M. Sapolsky: **Why Zebras Don't Get Ulcers. (Paperback book)**
Elizabeth Lasley and Bruce S. McEwen: **The End of Stress As We Know It. (Hardcover book).**

Lectures:
1) The concept of stress. Neuro-hormonal regulation of the stress response and key molecules in the stress response
2) Stress research in basic science and clinical practice. (Animal models, current topics).
3) Early stress and long term consequences on health and disease.
4) Somatic and neuropsychiatric consequences of stress. I.
5) Somatic and neuropsychiatric consequences of stress. II. (Dr Maria Simon)
6) Treatments strategies and coping with stress. (Dr Maria Simon)
Practices:
Coping strategies in practice. (Dr Maria Simon)

code	instructor in charge	title	credit	host department
OPKI-B-3/2014_CZB2	**Dr. Czéh, Boldizsár**	Introduction to cryo-EM	2	PTE SzKK
description	*Introduction to cryo-EM* is an intensive 4–6 week hybrid course designed for graduate students, early-career researchers, and facility users entering the world of cryo-EM. The curriculum begins with foundational knowledge, introducing cryo-EM's role in structural biology and the infrastructure required to get started. It then progresses through microscope instrumentation, safety practices, and the theory behind image formation. Learners gain practical skills in sample preparation, navigate key cryo-EM modalities—including Single Particle Analysis, tomography, and 2D crystallography—and experience full workflow demonstrations. The course concludes with guidance on using open-source software, accessing research communities, and continuing development in the field.			

Declaration of the course:
Semester: fall
Application: **name:** Horváth, Péter, Kőhegyi, Bianka
email: horvath.peter.3@pte.hu, kohegyi.bianka@pte.hu

Maximum number of attending students: no limit
Criteria of acceptance in case of overbooking: order of application

Type of examination: written
Type of remedial exam: written

Opportunities for making up for non-attendance: -

List of resources (book, note, other) **required for learning the curriculum:**
1, Joachim Frank: Sngle-Particle Cryo-Electron Microscopy: The Path Toward Atomic Resolution/ Selected Papers of Joachim Frank with Commentaries
2, Joachim Frank: Electron Tomography: Methods for Three-Dimensional Visualization of Structures in the Cell
3, Robert Glaeser (Author), Wah Chiu, Joachim Frank, rank David DeRosier, Kenneth Downing: Electron Crystallography of Biological Macromolecules

4, https://www.rodenburg.org/
5, https://nccat.nysbc.org/activities/nccat-remote-learning/em-reading-list/
6, https://nccat.nysbc.org/activities/courses/nccat-spa-short-course-2024/
7, https://nccat.nysbc.org/activities/courses/tomography-short-course-2021/
8, https://cryo-em-course.caltech.edu/overview
9, https://cryoem101.org/
10, https://www.globalsino.com/EM/

Topics and instructors of the activities (all lectures, practices, seminars separately):
Part 1: Foundations of Cryo-EM
An introduction to cryo-electron microscopy within the context of structural biology. Covers core concepts, imaging modalities (Single Particle Analysis, Cryo-Tomography, 2D Crystallography), infrastructure needs, and the overall workflow from data acquisition to structure determination.
Part 2: Instrumentation & Imaging Principles
Overview of the electron microscope and its key components—electron sources, lenses, detectors, and vacuum systems—alongside critical safety practices. Includes the physical principles of image formation, phase contrast, Fourier transforms, and Contrast Transfer Function (CTF) theory.
Part 3: Sample Preparation & Practical Challenges
Focus on preparing cryo-EM grids, vitrification techniques, and managing sample quality. Discusses major challenges such as radiation damage, ice thickness, preferred orientation, low signal-to-noise ratios, and dose limitations.
Part 4: Cryo-EM Modalities in Practice
Covers the practical application and workflows of major cryo-EM methods:

- **Single Particle Analysis (SPA):** from data collection to 3D reconstruction
- **Cryo-Electron Tomography:** tilt-series acquisition and subtomogram averaging
- **2D Crystallography & Helical Analysis:** diffraction analysis and symmetry in crystalline or tubular samples

Part 5: Integration, Tools & Future Directions
Brings together automated data collection (e.g. using EPU), end-to-end workflow demos, and visualization. Concludes with a guide to open-source software (Relion, CryoSPARC, Phenix), community resources, and next steps for continued learning or research in cryo-EM.

code	instructor in charge	title	credit	host department
OPGY_A-148/1993_CSE1	**Dr. Csikós, Eszter**	Editing professional texts	3	Department of Pharmacognosy
description	The course provides assistance in the high-quality preparation of the dissertation, presentation (for the defense and others), articles, other scientific publications, work plans, tender documentation, CV, and minutes. Participants can gain practical knowledge of the basics of copyright; the correct use of templates; how to correctly cite literary sources; what are the rules, structural and formal bases for creating figures, tables, and textual content elements; how to edit, format, and prepare a written work for printing. During the practical lessons, participants can learn to use document and text editor, presentation maker, and citation manager software (including World, PowerPoint, and Excel). During the lessons, the participants can work with example documents or even with their own research material (e.g. their thesis, dean's project, the outline of these). They can learn about common mistakes in theses and presentations, the difficulties experienced, and the simplest possible (often automated) solutions.			

Declaration of the course:
Semester: fall
Application deadline: September 15
Application: **name:** dr. Csikós, Eszter
telephone: 28832
email: csikos.eszter@gytk.pte.hu

Maximum number of attending students: 6
Criteria of acceptance in case of overbooking: declaration of acceptance from the leader of the course

Time frame of education total hours of the course: 24
number of lectures per week: 1
number of practices per week: 1

Type of examination: oral
Type of remedial exam: oral

Criteria of accepting the course (exams, maximum number of absence, etc.).: Maximum absence: 30%. Course acceptance condition: active participation in the sessions, completion of practical assignments in class.
Opportunities for making up for non-attendance: The instructor determines it on a case-by-case basis

List of resources (book, note, other) **required for learning the curriculum:** The user guides of the used programs are available on the Internet

Topics and instructors of the activities (all lectures, practices, seminars separately):

1. Basics of editing documents, copyright (Eszter Csikós)
2. Publication and document editing programs (Eszter Csikós)
3. Basic functions of text editing programs (Eszter Csikós)
4. Types and formatting requirements, and basic editing of professional documents (Eszter Csikós)
5. Segmentation, (automated) formatting of headings, sub-headings, paragraphs, typographical basics, built-in functions I. (Eszter Csikós)
6. Segmentation, (automated) formatting of headings, sub-headings, paragraphs, typographical basics, built-in functions II. (Eszter Csikós)
7. References in text, in figures, and in bibliography (Eszter Csikós)
8. Citation/reference management software (Eszter Csikós)
9. Formatting pictures, figures, tables (Eszter Csikós)
10. Infographics, graphical abstracts (Eszter Csikós)
11. Spell checking software (Eszter Csikós)
12. Ethical use of artificial intelligence (Eszter Csikós)
13. Tips and tricks, opportunities for cooperation (Eszter Csikós)
14. Recurring errors (Eszter Csikós)

code	instructor in charge	title	credit	host department
OPKL_A-319/1995_CSB1	**Dr. Csiky, Botond**	Cardiovascular diseases in chronic kidney disease	1	2nd Dept. of Internal Medicine and Nephrology-Diabetes Center
description	Chronic kidney disease patients have very high cardiovascular risk, attributable mostly to specific cardiovascular risk factors linked to the kidney disease per se, especially in patients with advanced kidney disease. Cardiovascular diseases are the most common causes of morbidity and mortality in these patients, especially in those needing renal replacement therapy. Attendees of the course will learn the types of renal replacement therapy, the specific cardiovascular diseases and its non-invasive diagnostic possibilities and up-to-date treatment.			

Declaration of the course:
Semester: fall
Application deadline: 10 September

Application: **name: Dr Csiky, Botond**
telephone: 536067
email: botond.csiky@pte.hu

Maximum number of attending students: 6
Criteria of acceptance in case of overbooking: declaration of acceptance from the leader of the course

Time frame of education total hours of the course: 7
number of lectures per week: 4
number of practices per week: 3

Type of examination: oral
Type of remedial exam: oral

Criteria of accepting the course (exams, maximum number of absence, etc.).: allowed absences: 2 occasions
Opportunities for making up for non-attendance: none

List of resources (book, note, other) **required for learning the curriculum:**
Notes taken at the lectures
Nephrology and Hypertension lecture notes for medical students (2nd Dept. of Medicine and Nephrology-Diabetes Center, Univ. of Pécs, Med. School, Clinical Center)
Comprehensive Clinical Nephrology, Elsevier

Topics and instructors of the activities (all lectures, practices, seminars separately):
Lectures:
Cardiovascular risk in chronic kidney disease (Dr. Botond Csiky)
How does bone- and mineral-disorder in advanced chronic kidney disease lead to cardiovascular complications? (Dr. Botond Csiky)
Renal replacement therapies and cardiovascular complications (Dr. Botond Csiky)
Kidney transplantation and cardiovascular risk (Dr. Botond Csiky)
Practices
Renal replacement therapies (Dr. Balázs Sági)
Non-invasive examinations of cardiovascular diseases (Dr. Balázs Sági)

code	instructor in charge	title	credit	host department
OPKL_B-322/1996_DEL1	**Dr. Deres, László**	Usage of high-resolution small animal ultrasound in preclinical research	2	1st Department of Internal Medicine
description	The course introduces the basics of ultrasound imaging, a non-invasive imaging technique. We become familiar with the physical principles of the method, its possible applications, advantages and limitations. The course is primarily recommended for those PhD students whose research may require non-invasive imaging, whether it is in the field of cardiovascular studies, tumor biology or embryology, etc. During the practical sessions, there will be an opportunity for the PhD students to perform ultrasound recordings and measurements related to their own experiments on rodents.			

Declaration of the course:
Semester: both
Application: **name:** Dr. Laszlo Deres
telephone: 29261
email: deres.laszlo@pte.hu

Maximum number of attending students: 6
Criteria of acceptance in case of overbooking: declaration of acceptance from the course's instructor in charge

Time frame of education	total hours of the course:	14 hours
	number of lectures per week:	5x2 hours
	number of practices per week:	2x2 hours

Type of examination: oral
Type of remedial exam: oral

Criteria of accepting the course (exams, maximum number of absence, etc.): exam
Opportunities for making up for non-attendance: under discussion

List of resources (book, note, other) **required for learning the curriculum:**
Richter Péter: Az ultrahang-képalkotás alapelemei és összefüggései, Universitas-Győr Nonprofit Kft., 2023.
Michelle Skinner: Handbook of Ultrasound Imaging, American Medical Publishers, 2023.

Topics and instructors of the activities (all lectures, practices, seminars separately):

1. The physics of medical imaging
2. Fundamentals of imaging
3. Basics of ultrasound
4. Ultrasound diagnostics
5. A-mode, B-mode, M-mode, Doppler modes, 3D, 4D
6. Practice
7. Practice
8. Exam

code	instructor in charge	title	credit	host department
OPKL_B-2/2004_FAR1	**Dr. Faludi, Réka**	Novel echocardiographic techniques for clinical practice and research	2	Heart Institute
description	In addition to the classical, widespreadly used echocardiographic methods, several new, special techniques have been developed during the last years helping to understand the work of the human heart. Some of these techniques are already involved in our clinical practice while the others are used for research purposes only. The aim of the course is to present the theoretical background and the practical aspects of these new techniques.			

Declaration of the course:

Semester:		autumn
Application deadline:		15 September
Application:	**name:**	dr. Faludi, Réka
	telephone:	72/536-001/35626
	e-mail:	faludi.reka@pte.hu

Maximum number of attending students: 10
Criteria of acceptance in case of overbooking: order of application

Time frame of education	total hours of the course: 14	
	number of lectures per week: 1x2	

Type of examination: written
Type of remedial exam: oral

Criteria of accepting the course (exams, maximum number of absence, etc.).: participating in min. 70 % of all lectures, successful exam
Opportunities for making up for non-attendance: personal consultation

List of resources (book, note, other) **required for learning the curriculum:**
W.F. Armstrong, T. Ryan: Feigenbaum's Echocardiography 7th edition, 2010

Topics and instructors of the activities (all lectures, practices, seminars separately):
1. Tissue Doppler imaging (Réka Faludi)
2. Basics of cardiac resynchronisation therapy (Ilona Goják)
3. Myocardial strain and strain rate (Réka Faludi)
4. Investigation of the myocardial torsion (Réka Faludi)
5. Particle Image Velocimetry: visualisation of the intracardiac flow pattern (Réka Faludi)
6. 3D echocardiography (Réka Faludi)
7. Practice (Réka Faludi)

code	instructor in charge	title	credit	host department
OPKL_B-149/1993_FAO1	**Dr. Falus, Orsolya**	Some Prominent Legal Institutions of the Traditional Islamic Legal Culture	2	Department of Public Health Medicine
description	Most of the world's Muslim-majority countries have laws that reference Sharia, the guidance Muslims believe God provided them on a range of spiritual and worldly matters. The traditions and narratives included in these sources evolved from those in Judaism and Christianity, the other major Abrahamic religions. Islamic law varies by country, is influenced by local customs, and evolves over time. The knowledge gained here may be useful for physicians working in such legal cultures.			

Declaration of the course:
Semester: fall

Maximum number of attending students: 20
Criteria of acceptance in case of overbooking:declaration of acceptance from the leader of the course

Time frame of education total hours of the course: 28
number of lectures per week: 2

Type of examination: written
Type of remedial exam: written

Criteria of accepting the course (exams, maximum number of absence, etc.).: Preparation of a study on the topic chosen and agreed upon with the lecturer in advance - after consultation; max. 3 absences are accepted without conseqences.
Opportunities for making up for non-attendance: consultation

List of resources (book, note, other) **required for learning the curriculum:**
Literature required:
FALUS, O. (2020). *The Legal Institutions of Charity in the Traditional Islamic Law*. Sarajevo: Dobra Knjiga (Available: "Tudásközpont" Library)

VARGA, J. – FALUS, O. – CSEH, B. (2023). Arguments gainst Interest from Economic and Legal Aspects in Islam and Christianity. In *Proceedings of International Conference of Eurasian Economies 2023*, İzmir – Türkiye, pp. 381-387. (Available: https://www.avekon.org/papers/2808.pdf)
VARGA, J. – TÓTH, G. – CSEH, B. – FALUS, O. (2021). The ethical role of interest-free economy in the Christian and Islamic systems. *European Journal of Educational and Social Sciences,* 6 (2), pp. 146 – 155. (Available: https://dergipark.org.tr/tr/download/article-file/1560019)

Literature recommended:

AUDA, J. (2008). Maqāṣid al-Sharīʿah A Contemporary Perspective. In *Maqasid Al-Sharia as Philosophy of Islamic Law: A Systems Approach* (pp. 1–25). International Institute of Islamic Thought. (Available: https://doi.org/10.2307/j.ctvkc67tg.7)
BADAWI, N. ((2009). *Introduction to Islamic Law*. Program on Humanitarian Policy and Conflict Research. Harvard University. (Available: https://hhi.harvard.edu/files/humanitarianinitiative/files/introduction_to_islamic_law.pdf?m=1614967781)
BERGER, M. S. (2018). Understanding Sharia in the West. *Journal of Law, Religion and State*, 6(2-3), 236-273. (Available: https://doi.org/10.1163/22124810-00602005)
Harvard University's *Islamic Law Blog*. (Available: https://islamiclaw.blog/)
SHAMSY, A. El - COULSON, N. J. (2024, July 3). Sharia. *Encyclopedia Britannica*. (Available: https://www.britannica.com/topic/sharia)
TORRANCE, D. (2019). *Sharia law courts in the UK*. Debate Pack, No. CDP-2019-0102, London: House of Commons Library (Available: https://researchbriefings.files.parliament.uk/documents/CDP-2019-0102/CDP-2019-0102.pdf)

Topics and instructors of the activities (all lectures, practices, seminars separately):

Week	Lecture	Lecturer
1	Islam as a Religion and as a Way of Life	Dr. habil. Orsolya Falus
2	The Concept of Islamic Law: Sharia; Fiqh; Usul al-Fiqh; Qur'an; Sunna; Ijma (Consensus); Urf (Custom); Ijtihad; Qiyas (Analogy); Naskh (Abrogation); Istihsan (Juristic Preference); Istishab; Al-Masalih al Mursala (Unregulated Benefits); Maqasid Al-Sharia (Legal Aims); Fatwa.	Dr. habil. Orsolya Falus
3	Furu al-Fiqh (Branches of the Law). Schools of Legal Thought: Ḥanafi School; Maliki School; Shafi School; Hanbali School.	Dr. habil. Orsolya Falus
4	Islam and Natural Legal Philosophy. Interest (Riba); Old and New Testament and Qur'an; Aristotle; St. Thomas Aquinas; Al-Gasali; Ibn Khaldun.	Dr. habil. Orsolya Falus
5	The 5 Pillars of Islam: Shahdah; Salah; Zakah; Sawm; Hajj.	Dr. habil. Orsolya Falus
6	Islam and Social Care: Zakah; Sadaqah; Waqf; Comparative Analysis: Waqf and Trust.	Dr. habil. Orsolya Falus
7	Charity in Islamic Banking Regulations: the Sharia Board; Islamic Financial Institutions.	Dr. habil. Orsolya Falus
8	Legal Capacity and Birth in Islam. Contraception and Abortion. Minors' Rights (Rashid).	Dr. habil. Orsolya Falus
9	Marriage and Mutah Marriage. Marriage Contract (Aqd Al-Nikah).	Dr. habil. Orsolya Falus
10	Polygamy and Divorce (Khul).	Dr. habil. Orsolya Falus
11	Penal Law in Sharia; Retaliation (Qisas); Blood Money (Diyah).	Dr. habil. Orsolya Falus

12	Sharia Law “Courts” (Councils) in the UK.	Dr. habil. Orsolya Falus
13	Sharia in Islam-minority Countries in Europe. Islamic Marriage in Europe Today.	Dr. habil. Orsolya Falus
14	Synthesis	Dr. habil. Orsolya Falus

code	instructor in charge	title	credit	host department
OPGY_A-148/1993_FAÁ1	**Dr. Farkas, Ágnes**	Morphology, physiology and taxonomic significance of pollen	4	Department of Pharmacognosy
description	The course focuses on fields of palynology that are significant in medical and pharmaceutical sciences, public health, forensic sciences and agriculture. The theoretical part provides an overview of pollen development, morphology and dispersal units. A section will be devoted to the background of pollen allergy, the monitoring of airborne pollen and spores, and the plant species that produce allergenic pollen in various seasons. Emphasis will be laid on the microscopic identification of various pollen types, which can be significant both in combatting pollen allergy, analysing honey samples and in forensic palynology.			

Declaration of the course:

Semester: spring
Application deadline: 4th week of spring semester
Application: **name:** dr. Farkas, Ágnes
telephone: 28822
email: agnes.farkas@aok.pte.hu

Maximum number of attending students: 10
Criteria of acceptance in case of overbooking: declaration of acceptance from the leader of the course

Time frame of education total hours of the course: 28
The course will be held in a single week, with 10 lecture classes, 6 seminars and 12 practice classes.

Type of examination: written
Type of remedial exam: oral

Criteria of accepting the course (exams, maximum number of absence, etc.).: Students can be absent from 15% of the classes. Students will be required to perform all practical tasks and prepare a lab notebook. Students have to hand in an assignment, which provides detailed analysis of the microscopic characters of pollen grains in a plant taxon or various honey samples.
Opportunities for making up for non-attendance: Personal consultation is possible.

List of resources (book, note, other) **required for learning the curriculum:**

- Shivanna K.R. Pollen Biology and Biotechnology. Science Publishers Inc., Enfield, NH, USA, 2003.
- Hesse M., Halbritter H., Zetter R., Weber M., Buchner R., Frosch-Radivo A., Ulrich S. Pollen Terminology. Springer, Wien, New York, 2009.
- Halbritter H., Weber M., Zetter R., Frosch-Radivo A., Buchner R., Hesse M. PalDat - Illustrated Handbook on Pollen Terminology. University of Vienna, Vienna, 2005.
- Dafni A., Kevan P.G., Husband B.C. (Eds.) Practical Pollination Biology. Enviroquest Ltd., Cambridge, Ontario, Canada, 2005.
- www.paldat.org

Topics and instructors of the activities (all lectures, practices, seminars separately):

Lectures:

1.	Palynology and its fields	Dr. Ágnes Farkas
2.	Development of pollen grains	Dr. Ágnes Farkas
3.	Dispersal units of pollen	Dr. Ágnes Farkas
4.	Size, polarity, shape and symmetry of pollen and spores	Dr. Ágnes Farkas
5.	NPC system, aperture types	Dr. Ágnes Farkas
6.	Structure of the pollen wall, surface of the pollen grain	Dr. Ágnes Farkas
7.	Physiology of pollen	Dr. Ágnes Farkas
8.	Pollen allergy	Dr. Ágnes Farkas
9.	Pollen calendar. Main allergens of each pollen season.	Dr. Ágnes Farkas
10.	Management of symptoms of pollen allergy	Dr. Ágnes Farkas

Seminars:

1.	Light and electron microscopic examination of pollen	Dr. Ágnes Farkas
2.	Taxonomic significance of pollen, pollen identification keys	Dr. Ágnes Farkas
3.	Using internet databases and websites related to pollen	Dr. Ágnes Farkas
4.	Using internet databases and websites related to pollen	Dr. Ágnes Farkas
5.	Pollen traps, analysis of samples	Dr. Ágnes Farkas
6.	Pollen traps, analysis of samples	Dr. Ágnes Farkas

Practices:

1.	Pollen viability studies with different methods	Dr. Ágnes Farkas
2.	Pollen viability studies with different methods	Dr. Ágnes Farkas
3.	Light microscopic study of pollen grains of various plant taxa	Dr. Ágnes Farkas
4.	Light microscopic study of pollen grains of various plant taxa	Dr. Ágnes Farkas
5.	Light microscopic study of pollen grains of various plant taxa	Dr. Ágnes Farkas
6.	Light microscopic study of pollen grains of various plant taxa	Dr. Ágnes Farkas
7.	Light microscopic analysis of samples from pollen traps	Dr. Ágnes Farkas
8.	Light microscopic analysis of samples from pollen traps	Dr. Ágnes Farkas
9.	Preparing pollen samples from honeys for microscopic analysis	Dr. Ágnes Farkas
10.	Preparing pollen samples from honeys for microscopic analysis	Dr. Ágnes Farkas
11.	Light microscopic study of honey pollen samples	Dr. Ágnes Farkas
12.	Light microscopic study of honey pollen samples	Dr. Ágnes Farkas

code	instructor in charge	title	credit	host department
OPGY_A-148/1993_FAÁ2	**Dr. Farkas, Ágnes** **Dr. Kocsis, Marianna**	Plant microtechniques	4	Department of Pharmacognosy, FS, Institute of Bilogy
description	The course focuses on the most frequently applied plant microtechniques, used to study various plant tissues and cells, particularly in the case of medicinal plants. After providing the theoretical background, students will master the microscopic techniques applied in the study of (medicinal) plants during laboratory practices, starting from sampling through analyzing fresh plant samples and processing fixed samples, to microscopic analyses, measurements and appropriate documentation.			

Declaration of the course:

Semester: **spring**
Application deadline: 4th week of the spring semester
Application: **name:** dr. Farkas, Ágnes
telephone: 28822
email: agnes.farkas@aok.pte.hu

Maximum number of attending students: 10
Criteria of acceptance in case of overbooking: declaration of acceptance from the leader of the course

Time frame of education total hours of the course: 28
The classes will be held in a single week, which suits all the students. The course will include 4 lecture classes, 2 seminars and 22 practice classes.

Type of examination: written
Type of remedial exam: oral

Criteria of accepting the course (exams, maximum number of absence, etc.).: Students can be absent from 15% of classes. Students are required to actively participate in the course, and they can master various techniques by working with plant samples related to their own research or samples provided by course instructors. Students have to prepare a lab notebook, which will be evaluated by course instructors.
Opportunities for making up for non-attendance: Personal consultation is possible.
List of resources (book, note, other) **required for learning the curriculum:**

- Ruzin Steven E.: Plant microtechnique and microscopy. Oxford University Press, New York, Oxford, 1999.
- Yeung E.C.T, Stasolla C., Sumner M.J., Huang B.Q. (eds): Plant Microtechniques and Protocols, Springer, 2015
- Kocsis M.: Plant Microtechniques – electronic course material, Pécs, 2019
- handouts provided by course instructors

Topics and instructors of the activities (all lectures, practices, seminars separately):
Lectures:

1.	Techniques of leaf clearing	Dr. Ágnes Farkas
2.	Conserving and fixing of plant samples. Embedding and sectioning	Dr. Ágnes Farkas
3.	Light and fluorescent microscopic dyes	Dr. Marianna Kocsis
4.	Light microscope, fluorescent microscope	Dr. Marianna Kocsis

Seminars:

1.	Fluorescent microscopy	Dr. Marianna Kocsis
2.	Taking digital microphotos, microscopic measurements	Dr. Marianna Kocsis

Practices:

1.	Leaf clearing with short method (chemical + heat treatment)	Dr. Ágnes Farkas
2.	Leaf clearing with long (cold) method 1	Dr. Ágnes Farkas
3.	Leaf clearing with long (cold) method 2	Dr. Ágnes Farkas
4.	Conserving plant samples	Dr. Ágnes Farkas
5.	Dehydration of plant samples	Dr. Ágnes Farkas
6.	Embedding of plant samples into paraplast	Dr. Ágnes Farkas
7.	Embedding of plant samples into artificial resin	Dr. Ágnes Farkas
8.	Mounting of blocks	Dr. Ágnes Farkas
9.	Sectioning of embedded samples with rotation microtome	Dr. Ágnes Farkas
10.	Sectioning of embedded samples with rotation microtome	Dr. Ágnes Farkas
11.	Staining and mounting of sections	Dr. Ágnes Farkas
12.	Staining and mounting of sections	Dr. Ágnes Farkas
13.	Examining various plant organs on permanent preparations	Dr. Marianna Kocsis
14.	Qualitative and quantitative analysis of leaf cross sections with light microscopy	Dr. Marianna Kocsis
15.	Staining and processing of leaf samples for fluorescent microscopy	Dr. Marianna Kocsis
16.	Microlocalization of flavonoids in leaf tissues	Dr. Marianna Kocsis
17.	Taking microphotos, qualitative and quantitative analysis of micrographs	Dr. Marianna Kocsis
18.	Staining flower preparations, processing them for fluorescent microscopy	Dr. Marianna Kocsis

19.	Observation of flower parts, pollen grains and pollen tubes with fluorescer microscopy	Dr. Kocsis Marianna
20.	Studying pollination and fertilization with fluorescent microscope	Dr. Kocsis Marianna
21.	Qualitative and quantitative analysis of micrographs	Dr. Kocsis Marianna
22.	Summing up and evaluating results	Dr. Kocsis Marianna

code	instructor in charge	title	credit	host department
OPKI_B-1/2005_FEG1	**Dr. Fehér, Gergely**	The effect of chronic pain on work capacity	2	Centre for Occupational Medicine
description	Chronic pain can be difficult for single provider to manage in a busy clinical setting. In this course, we discuss etiology and pathophysiology of chronic pain, along with variables that impact the severity of chronic pain and functional loss, focusing on work ability.			

Declaration of the course:

Semester: both
Application deadline: 01/09/ and 01/02/
Application: **name:** dr. Fehér, Gergely
telephone: 72/507-523
email: feher.gergely@pte.hu

Maximum number of attending students: 10
Criteria of acceptance in case of overbooking: declaration of acceptance from the leader of the course

Time frame of education total hours of the course: 14
number of seminars per week: 2

Type of examination: oral
Type of remedial exam: oral

Criteria of accepting the course (exams, maximum number of absence, etc.).: Participation over 70%, passing the oral exam

Opportunities for making up for non-attendance: in accoradance with the instructor

List of resources (book, note, other) **required for learning the curriculum:**
Adams and Victor's Principles of Neurology 10th Edition
Diabetic neuropathies: diagnosis and management.
Deli G, Bosnyak E, Pusch G, Komoly S, Feher G.
Neuroendocrinology. 2013;98(4):267-80.

Topics and instructors of the activities (all lectures, practices, seminars separately):
1st week. Gergely Feher: Neuranatomy of pain
2nd week. Gergely Feher: Nociceptive pain
3rd week. Gergely Feher: Neuropathic pain
4th week. Gergely Feher: Treatment strategies in chronic pain
5th week. Antal Tibold: The effect of pain on working ability
6th week. Gabriella Pusch: Chronic pain hurts the brain
7th week. Gergely Feher: Summary, case-reports

code	instructor in charge	title	credit	host department
OPKI_B-1/2005_FEG2	**Dr. Fehér, Gergely**	The effect of cerebrovascular diseases on working capacity	2	Centre for Occupational Medicine
description	Stroke is the leading cause of disability and one of the main causes of death worldwide. In this course, we discuss etiology and pathophysiology of stroke, along with variables that impact the acute and chronic management, focusing on work ability.			

Declaration of the course:

Semester: both
Application deadline: 01/09/ and 01/02/9
Application: **name:** dr. Fehér, Gergely
telephone: 72/507-523
email: feher.gergely@pte.hu

Maximum number of attending students: 10
Criteria of acceptance in case of overbooking: declaration of acceptance from the leader of the course

Time frame of education total hours of the course: 14
number of seminars per week: 2

Type of examination: oral
Type of remedial exam: oral

Criteria of accepting the course (exams, maximum number of absence, etc.).: Participation over 70%, passing the oral exam
Opportunities for making up for non-attendance: in accoradance with the instructor

List of resources (book, note, other) **required for learning the curriculum:**
Adams and Victor's Principles of Neurology 10th Edition
Statintherapy in the primary and the secondary prevention of ischaemic cerebrovascular diseases.
Feher A, Pusch G, Koltai K, Tibold A, Gasztonyi B, Szapary L, Feher G.
Int J Cardiol. 2011;148(2):131-8.
Topics and instructors of the activities (all lectures, practices, seminars separately):
1st week. Gergely Feher: Neuranatomy of stroke
2nd week. Gergely Feher: Stroke syndromes
3rd week. Gergely Feher: Acute stroke management
4th week. Gergely Feher: Secondary stroke prevention
5th week. Antal Tibold: The effect of stroke on working ability
6th week. Gabriella Pusch: Post stroke pain, fatigue and depression
7th week. Gergely Feher: Summary, case-reports

code	instructor in charge	title	credit	host department
OPKI_B-1/2005_FEG3	**Dr. Fehér, Gergely**	Complex approach to digital addictions	2	Centre for Occupational Medicine
description	As a result of digitalisation and the increasing use of the internet, its problematic use is on the rise in the 21st cen-tury, with a predominant impact on minors and a potentially increasing challenge for health care systems in the fu-ture. The main risk factors for this phenomenon are age, inadequate social and family relationships, and can be as-sociated			

	with mental problems such as depression and anxiety, somatic illnesses, often with additional dependencies. Imaging studies can detect abnormally functioning brain areas in the affected individuals, however, there is a signifi-cant heterogeneity among them. Similar to other addictions, extensive internet use negatively affects the individual in all areas of life. We do not have a high level of evidence for treatment yet, but it appears that treatments used in other (classic) addictive diseases may be effective.

Declaration of the course:

Semester: both
Application deadline: 15th of September and 15th of February
Application: **email**: feher.gergely@pte.hu

Maximum number of attending students: 10

Criteria of acceptance in case of overbooking: declaration of acceptance from the leader of the course

Time frame of education total hours of the course: 14
number of lectures per week: 7
number of seminars per week: 7

Type of examination: oral
Type of remedial exam: oral

Criteria of accepting the course (exams, maximum number of absence, etc.).: successful oral exam (>70%), participation in 75% of classes.

Opportunities for making up for non-attendance: based on individual consultation

List of resources (book, note, other) **required for learning the curriculum:**
Fariba KA, Gokarakonda SB. Impulse Control Disorders. 2023 Aug 14. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan–.
Szapáry Á, Kovács M, Tóth G, Váradi I, Mészáros J, Kósa G, Kapus K, Bankó Z, Tibold A, Fehér G. Internetfüggőség: a 21. század orvosi kihívása? [Internet addiction: the medical challenge of the 21st century? br]. Orv Hetil. 2022 Sep 18;163(38):1506-1513

Topics and instructors of the activities (all lectures, practices, seminars separately):
1st week lecture: Formation, classification and psychological characteristics of addictions (Dr. Balázs Pankász)
Week 2 lecture: The neuroanatomy of addictions (Dr. József Farkas)
Week 3 lecture: Comparison of classic and digital addictions (Dr. Ildikó Radványi)
4th week lecture: Measurement of digital addictions (Dr. Gergely Fehér)
Week 5 lecture: Digital addictions and mental illnesses (Dr. Balázs Pankász)
Week 6 presentation: Digitalis addictions and somatic diseases (Dr. Gergely Fehér)
Week 7 lecture: Digital addictions: main research directions (Dr. Gergely Fehér)
8th week of practice: main aspects of conducting questionnaire tests (Dr. Lilla Horváth)
Week 9 exercise: online and paper-based questionnaires in research (Dr. Gergely Fehér)
10th week exercise: measurement possibilities of digital addictions (Dr. Gergely Fehér)
Week 11 exercise: treatment of digital addictions (Dr. Balázs Pankász)
Week 12 exercise: digital addictions and somatic diseases - the importance of screening tests (Dr. Gergely Fehér)
Week 13 exercise: data analysis options (Dr. Gergely Fehér)
Week 14 exercise: summary, discussions (Dr. Gergely Fehér)

code	instructor in charge	title	credit	host department
OPKI_B-1/2005_FEG4	**Dr. Fehér, Gergely**	Complex approach to burnout	2	Centre for Occupational Medicine
description	paradoxically affects medical personnel to the greatest extent. Due to its frequency, it is also called the epidemic of our time (along with diabetes). Overload/compulsion to perform (whether due to internal motivation or external factors - lack of labor), increased stress, work addiction and mania are the most important factors in the development of the syndrome, especially in cases where the work is directed at people for a long time , requires long-term concentration and emotional involvement, active intervention, while quick spectacular results and positive feedback are relatively rare (this group includes health workers, teachers, social workers, pastors, therapists, etc.) Although according to its classification, the burnout is considered an occupational disease, in addition to psychological/emotional exhaustion and reduced work capacity, there appears to be a significant correlation with diabetes and cardiovascular diseases, various pain syndromes, respiratory and gastrointestinal diseases, and the occurrence of death at a young age (<45 years), which is the basis of the classification of the disease requires reconsideration.			

Declaration of the course:

Semester: both
Application deadline: 15th of September and 15th of February
Application: **email**: feher.gergely@pte.hu

Maximum number of attending students: 10
Criteria of acceptance in case of overbooking: declaration of acceptance from the leader of the course

Time frame of education total hours of the course: 14
number of lectures per week: 7
number of seminars per week: 7

Type of examination: oral
Type of remedial exam: oral

Criteria of accepting the course (exams, maximum number of absence, etc.).: successful oral exam (>70%), participation in 75% of classes.

Opportunities for making up for non-attendance: based on individual consultation

List of resources (book, note, other) **required for learning the curriculum:**
Huecker MR, Shreffler J, McKeny PT, Davis D. Imposter Phenomenon. 2023 Jul 31. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan–.
Office of the Surgeon General (OSG). Addressing Health Worker Burnout: The U.S. Surgeon General's Advisory on Building a Thriving Health Workforce [Internet]. Washington (DC): US Department of Health and Human Services; 2022–.

Topics and instructors of the activities (all lectures, practices, seminars separately):
1st week lecture: The development, classification and psychological characteristics of burnout (Dr. Balázs Pankász)
Week 2 lecture: The neuroanatomy of burnout (Dr. József Farkas)
Week 3 presentation: Workplace, learning and parental burnout (Dr. Gergely Fehér)
4th week lecture: Measurement of burnout (Dr. Gergely Fehér)

Week 5 lecture: Burnout and mental illnesses (Dr. Balázs Pankász)
Week 6 lecture: Burnout and somatic diseases (Dr. Gergely Fehér)
Week 7 lecture: Burnout: main research directions (Dr. Gergely Fehér)
8th week of practice: main aspects of conducting questionnaire tests (Dr. Lilla Horváth)
Week 9 exercise: online and paper-based questionnaires in research (Dr. Gergely Fehér)
Week 10 exercise: options for measuring burnout (Dr. Gergely Fehér)
Week 11 exercise: burnout treatment (Dr. Balázs Pankász)
Week 12 exercise: burnout and somatic diseases - importance of screening tests (Dr. Gergely Fehér)
Week 13 exercise: data analysis options (Dr. Gergely Fehér)
Week 14 exercise: summary, discussions (Dr. Gergely Fehér)

kurzuskód	felelős oktató	elnevezés	kredit	oktató intézet
OPGY_A-143/1993_FAT1	**Dr. Fittler András Tamás**	Evaluation of the online pharmaceutical market and preventing the dangers of substandard and falsified medicines	1	GYTK Gyógyszerészeti Intézet
tematika	The PhD course will provide insight into the current issues of the online pharmaceutical market and the dangers of counterfeit medicines. We will discuss the problem of Substandard and Falsified (SF) Medical Products. During the seminars real world data on legitimate and rogue online pharmacies, various stakeholders, networks, products and information content will be introduced, along with the discussion of measures combating illegal peddling of pharmaceuticals. Novel information technology and data-science methods on the evaluation of this enormous online market will be discussed. Participants will gather further knowledge on how to identify medical products most at risk of being falsified, and how to prevent SF medical products from entering the supply chain.			

Declaration of the course:

Semester: autumn
Application deadline: 7 September
Application: **name:** **Dr. Fittler András**
telephone: **+36205566509**
email: fittler.andras@pte.hu

Maximum number of attending students: 10
Criteria of acceptance in case of overbooking: order of application

Time frame of education total hours of the course: 7
number of seminars per week:1

Type of examination: written
Type of remedial exam: written

Criteria of accepting the course: PhD students will participate in group discussions, assessment will focus on the competencies acquired through knowledge, skills and attitudes.
Opportunities for making up for-non-attendance:
Please attend all seminars, and participate in the interactive group work and projects.

List of resources required for learning the curriculum: Materials will be provided online during the seminars.

Topics and instructors of the activities:
1. The problem and prevalence of counterfeiting and falsifying of medicinal products

2. How to identify medical products at risk of being falsified and how to prevent SF medical products from entering the supply chain?
3. Nomenclature and categorization of online pharmacies. Identifying stakeholders of the online pharmacy market
4. Current practice and legal framework of online drug distribution in Europe, international comparison
5. Technologies against SF medicines. Introduction and assessment of national and international verification systems of online vendors
6. Assessment of search engine result pages, online vendor characteristics, product information. Application of a complex risk assessment methodology for project work
7. Presentation and discussion of project works: e.g. Evaluation of hazards associated with medicinal products sourced via the internet, Fighting the global trade of SF medicines.

code	instructor in charge	title	credit	host department
OPGY_A-292/1994_GAA1	**Dr. Garami, András**	Theoretical and methodological aspects of complex energy balance (body mass and body temperature) regulation in animal models	2	Institute for Translational Medicine
description	By attending the course students will get detailed insight into the theoretical background and modern aspects of body mass and body temperature regulation, then based on the theoretical background they will see the various methods used to measure these processes in animal models.			

Declaration of the course:

Semester: both
Application deadline: by the end of the 3rd week of the given semester
Application: **name:** András Garami, M.D., Ph.D.
telephone: 536-246
email: andras.garami@aok.pte.hu

Maximum number of attending students: N/A
Criteria of acceptance in case of overbooking: order of application

Time frame of education total hours of the course: 14
number of lectures per week 1:
number of practices per week: 1

Type of examination: oral
Type of remedial exam: oral

Criteria of accepting the course (exams, maximum number of absence, etc.).: Students must attend at least 70% of the lectures/practices and pass the exam at the end of the course.

Opportunities for making up for non-attendance: Based upon individual agreements.

List of resources (book, note, other) **required for learning the curriculum:**
Vanilloid Receptor TRPV1 in Drug Discovery (A. Gomtsyan, C.R. Faltynek), Wiley & Sons, 2010.
www.FeverLab.net
Chapter 23. Temperature regulation. In: Lecture Notes on Human Physiology, 5th edition, ed. by Petersen O. Oxford, UK: Blackwell, 2007, p. 603-615.

Topics and instructors of the activities (all lectures, practices, seminars separately):
1-2. History of the research of complex energy balance regulation.
3-4. Principles of the regulatory mechanisms in body mass and body temperature maintenance.
5-6. The modern theory of thermoregulation, the role of transient receptor potential (TRP) ion channels in temperature regulation.
7-8. The role of the capsaicin receptor (TRPV1) in thermoregulation and energy balance.
9-10. Methodological tools for the investigation of body mass regulation in animal models.
11-12. Methodological tools for the investigation of body temperature regulation in animal models.
13-14. Exam.

code	instructor in charge	title	credit	host department
OPEL_B-134/1993_GBA1	**Dr. Gaszner, Balázs**	Functional (neuro)morphology: theory and practice. How to use immunolabeling and RNAscope to obtain result with functional value?	2	Department of Anatomy
description	After discussion of the theory of immunohistological techniques, we offer the opportunity to practice these techniques in the laboratory. Fixation by perfusion, sectioning, simple and multiple (fluorescence) labeling will be performed, including digital documentation, image analysis, and statistical evaluation as well. The RNAscope in situ hybridization technique will be introduced also. The course, because of the laboratory work will be held in blocks. The preliminary plan is that the course takes place on three consecutive afternoons in four-five teaching hours, respectively. At the end of the course a test will be written, the time point of this will be discussed with the participants.			

Declaration of the course:
Semester: botj
Application deadline: 1st of March / 1st of October

Maximum number of attending students: 8 students / semester
Criteria of acceptance in case of overbooking: order of application

Time frame of education total hours of the course: 14
number of lectures: 4 lectures to be held in two block)
number of practices: (2x3,5 hours laboratory practice)

Type of examination: written
Type of remedial exam: written

Criteria of accepting the course (exams, maximum number of absence, etc.): Successful test result and attendance at (least) 70% of the classes.
Opportunities for making up for non-attendance: None.

List of resources (book, note, other) **required for learning the curriculum:** Lecture materials will be given as digital hand-outs for the participants.

Topics and instructors of the activities (all lectures, practices, seminars separately):
Lectures are given by Dr. Angéla Kecskés (7%), Dr. Viktória Kormos (43%) (Dept. of Pharmacology and Pharmacotherapy) Dr. Miklós Kecskés (7%) (Physiology Department), Dr. Gergely Berta (7%) (Dept. of

Medical Biology) and Dr. Balázs Gaszner (35%)(Anatomy Dept.). Laboratory practices are given by Dr. Viktória Kormos and Dr. Balázs Gaszner.

Classes:
1. General introduction to functional (neuro)morphological, histological techniques (Dr. Balázs Gaszner).
2. Routine histological technique (Dr. Viktória Kormos).
3. Theoretical background of immunolabeling. Visualization by enzymatic reactions. Combined fluorescent labeling, controls. (Dr. Viktória Kormos)
4. Theoretical background of RNAscope in situ hybridization. (Dr. Angéla Kecskés)
5. Histological techniques related to electrophysiology. (Dr. Miklós Kecskés)
6. Theory of image analysis: cell counting, co-localization studies, densitometry (Dr. Balázs Gaszner)
7. Preparation of required solutions, buffers. (Laboratory practice, Dr. Balázs Gaszner)
8. Perfusion fixation on laboratory animals. Tissue sampling. Post fixation. (Laboratory practice, Dr. Viktória Kormos)
9. Cutting for free floating technique. Basic neuroanatomy in rodents. (Laboratory practice, Dr. Balázs Gaszner)
10. Permeabilisation, blocking, antiserum dilutions, preadsorption control (Laboratory practice, Dr. Viktória Kormos)
11. Biotin labeled secondary antibody treatment, fluorescent dye labeled secondary antibody treatment. (Laboratory practice, Dr. Viktória Kormos)
12. Peroxidase conjugated avidin-biotin complex treatment. Visualization of immunolabeling, mounting, covering. (Laboratory practice, Dr. Viktória Kormos)
13. Digital imaging with light microscope. Image analysis. (Laboratory practice, Dr. Balázs Gaszner)
14. Digital imaging, and picture analysis. Fluorescence and confocal microscopy. (Lecture and practical demonstration Dr. Gergely Berta)

code	instructor in charge	title	credit	host department
OPKL_B-2/2004_GAB1	**Dr. Gaszner, Balázs**	Non-invasive assessment of arterial function for the determination of cardiovascular risk	2	Heart Institute
description	The leading cause of death worldwide is the cardiovascular disease. Investigation of aortic stiffness has become increasingly important for total cardiovascular risk estimation. Several different methodologies have been proposed to the assessment of arterial stiffness. In our course we overview the different measurement techniques and compare them between high cardiovascular risk patient groups.			

Declaration of the course:

Semester: fall
Application deadline: 30 of September
Application: **name:** dr. Gaszner, Balázs
telephone: *0633
email: gaszner.balazs@pte.hu

Maximum number of attending students: 10

Criteria of acceptance in case of overbooking: order of application, declaration of acceptance from the leader of the course

Time frame of education total hours of the course: 14
number of lectures per week: 2

Type of examination: written
Type of remedial exam: written

Criteria of accepting the course (exams, maximum number of absence, etc.).: successful exams, maximum number of absence: 4 hours
Opportunities for making up for non-attendance: consultation

List of resources (book, note, other) **required for learning the curriculum:** hand out

Topics and instructors of the activities (all lectures, practices, seminars separately):
1. Cardiovascular disease (Balázs Gaszner)
2. Pathophysiology, biomarkers (Balázs Gaszner)
3. Arterial stiffness parameters (Balázs Gaszner)
4. Ultrasound techniques (Balázs Gaszner)
5. Oscillometric techniques (Balázs Gaszner)
6. Prevention of cardiovascular disease (Balázs Gaszner)
7. Practical demonstration (Balázs Gaszner)

code	instructor in charge	title	credit	host department
OPKL_B-2/2004_HEL1	**Dr. Hejjel, László**	Biomedical measurement technology	2	Heart Institute
description	The application of measurement instrumentation is unavoidable today in medical diagnostics and biomedical research. The theory of operation of the devices will be discussed according to the physical nature of the measured value (voltage, pressure, flow, temperature, optical). Also the electronical background will be detailed both in hardware and software sides. Following the review of theory, on every occasion a practical presentation of the given instrument or a computer-simulation, or bed-side demonstration deepens the knowledge. The correct interpretation of the results provided by the devices or instruments, and the recognition of measurement errors and their parry can be easier after the acquirement of the approach of the course.			

Declaration of the course:

Semester:		spring
Application deadline:		end of the first week of given semester
Application:	**name:**	Dr. Hejjel, László
	telephone:	35604, 35605
	email:	hejjel.laszlo@pte.hu

Maximum number of attending students: 12
Criteria of acceptance in case of overbooking: order of application

Time frame of education total hours of the course: 7x2
number of lectures per week: 1
number of seminars per week: 1

Type of examination: written
Type of remedial exam: oral

Criteria of accepting the course (exams, maximum number of absence, etc.).: max. absece: 2, examination on the last occasion
Opportunities for making up for non-attendance: oral referral

List of resources (book, note, other) **required for learning the curriculum:** presentations, issued e-material in pdf

Topics and instructors of the activities (all lectures, practices, seminars separately):
(one presentation and one seminar in the given topic at every occasion)

1. The definition, errors, and accuracy of measurement, interpretation of the results. Classification of measurement instrumentation
2. Acquiring and amplification of electrical signals: ECG, EEG, etc. Measuring impedance
3. Measuring pressure and flow. Acoustic measurements. Temperature measurement
4. Measurements based on optical methods
5. Digital signal processing: sampling, filtering, storage, analysis. Display devices
6. Power supply, electrical safety, electromagnetic compatibility. Wired and wireless data transmission
7. Summary. Examination

code	instructor in charge	title	credit	host department
OPKL_B-2/2004_HEL2	**Dr. Hejjel, László**	Technology and applications of heart rate variability analysis	2	Heart Institute
description	Heart rate variability (HRV) analysis is considered a non-invasive functional examination of the autonomic nervous system. The elevating number of the published materials in the topic reflects its significance not only in the research field but also in clinical practice: numerous cardiovascular and other diseases it is considered as an independent prognostic factor, it can predict the onset of certain events (arrhythmias, foetal hypoxia). HRV analysis necessitates special technical conditions and approach for correct interpretation of the results, which also will be reviewed on the course. Also the potential role of HRV analysis in "health monitoring" will be mentioned.			

Declaration of the course:

Semester: autumn
Application deadline: end of the first week of given semester
Application: **name:** Dr. Hejjel, László
telephone: 35604, 35605
email: hejjel.laszlo@pte.hu

Maximum number of attending students: 12

Criteria of acceptance in case of overbooking: order of application

Time frame of education total hours of the course: 7x2
number of lectures per week: 1
number of seminars per week: 1

Type of examination: written
Type of remedial exam: oral

Criteria of accepting the course (exams, maximum number of absence, etc.).: max. absece: 2, examination on the last occasion

Opportunities for making up for non-attendance: oral referral

List of resources (book, note, other) **required for learning the curriculum:** presentations, issued e-material in pdf

Topics and instructors of the activities (all lectures, practices, seminars separately):
(one presentation and one seminar in the given topic at every occasion)

1. History of heart rate variability (HRV) analysis. Anatomical, physiological background. Hardware background of measurement
2. HRV analysis in the time domain and frequency domain
3. HRV analysis with non-linear methods (chaos theory). Reliability and correct interpretation of HRV analysis
4. HRV analysis in the research
5. HRV analysis in the clinical practice. Novel parameters, novel potential applications
6. Home monitoring, telemonitoring. Wearable electronics, intelligent clothes, intelligent home
7. Summary. Examination

code	instructor in charge	title	credit	host department
OPGY_A-292/1994_HEC2	**Dr. Hetényi, Csaba**	Strategies and methods of drug research	4	Pharmacology and Pharmacotherapy
tematika	The course gives and overview of current approaches of drug research. Both traditional and rational strategies will be discussed. An emphasis is placed on the drug research aspect of relevant experimental and theoretical methodologies. The course also provides practical knowledge on engineering of new drug candidates. In the Journal Club sections, up-to-date research results will be discussed using recent papers from the literature.			

Declaration of the course:

Semester: autumn
Application deadline: the 3rd teaching day of the semester
Application: **name:** Dr. Hetényi, Csaba
telephone: 31649
email: hetenyi.csaba@aok.pte.hu

Maximum number of attending students: 3
Criteria of acceptance in case of overbooking: declaration of acceptance from the leader of the course

Time frame of education total hours of the course: 28
number of lectures per week: 1

Type of examination: oral
Type of remedial exam: oral

Criteria of accepting the course (exams, maximum number of absence, etc.).: oral exam
Opportunities for making up for non-attendance: in the last week of the semester
List of resources (book, note, other) **required for learning the curriculum:** presentations material

Topics and instructors of the activities (all lectures, practices, seminars separately):
1) Goals, trends, and terminology of drug research (Hetényi Csaba)
2) Overview of strategies of drug design and discovery (Hetényi Csaba)
3) Traditional discovery 1 - HTS (Hetényi Csaba)
4) Traditional discovery 2 - Natural prodcucts as templates (Hetényi Csaba)
5) Rational design (Hetényi Csaba)
6) Target-based design 1 - Types of targets, non-protein targets (Hetényi Csaba)
7) Target-based design 2 - Target selection and validation, polypharmacology (Hetényi Csaba)
8) Target-based design 3 - Protein targets (Hetényi Csaba)
9) Ligand-based design, serendipity, and drug repositioning (Hetényi Csaba)
10) Structure determination methods (experimental and theoretical) (Hetényi Csaba)

11) Design of pharmacodynamics (experimental and theoretical methods) (Hetényi Csaba)
12) Design of pharmacokinetics (ADMETox optimization) (Hetényi Csaba)
13) Journal Club 1 - Comparison of strategies (Hetényi Csaba)
14) Journal Club 1 - Development of new methods and paradigm shifts (Hetényi Csaba)

code	instructor in charge	title	credit	host department
OPKI-B-1/2014_KAB1	**Dr. Kálmán, Bernadette**	Genetics and genomics in neurology	2	Institute of Laboratory Medicine
description	This course will review basic concepts of genetics and genomics with focus on new diagnostic and therapeutic approaches in neurology. Mendelian, mitochondrial and complex trait disorders will be discussed. Briefly, somatic mutations in tumors and personalized treatment options will also be reviewed.			

Declaration of the course:

Semester: spring
Application deadline: January 31,
Application: **name:** Prof. Dr. Kálmán, Bernadette
telephone: 72-501-500/29205
email: Bernadette.kalman@pte.hu

Location of the Course: PTE Szenagothai Research Center, 7624. Pecs, Ifjusag street 20.

Maximum number of attending students: 30
Criteria of acceptance in case of overbooking: declaration of acceptance from the leader of the course

Time frame of education total hours of the course: 14h
number of lectures per week: 14h (lectures completed in 2 consecutive days)

Type of examination: written
Type of remedial exam: written

Criteria of accepting the course (exams, maximum number of absence, etc.).:
exam and min. 9 attended lectures
Opportunities for making up for non-attendance: review of the lecture powerpoint slides and the recommended book

List of resources (book, note, other) **required for learning the curriculum:**
Lecture material (powerpoint, pdf)
Tom Strachan, Andrew P Read: Human Molecular Genetics. Taylor and Francis Group 2018. 5th Edition.

Topics and instructors of the activities (all lectures, practices, seminars separately):
1,
8-8:45 Basic principles of nucleic acids, genome, genes -BK
8:45-9:30 Gene expression and regulation - BK
9:30-10:15 Patterns of inheritance - BK
Break
10:30 - 11:15 Mitochondrial genetics and diseases – BK
11:15-12 Complex trait genetics and diseases - BK
12-12:45 Alzheimer's disease - BK
Break
13:30-14:15 Amyloid neuropathies - BK
14:15-15 Frontotemporal dementias and prion diseases - BK

2,
8-8:45 Huntigton's disease - BK
8:45-9:30 Cerebellar ataxias_AR - BK
9:30-10:15 Cerebellar ataxias_AD - BK
10:15-11 Neurodegeneration with brain iron accumulation - BK
Break
11:15-12 Spinal muscular atrophy - BK
12-12:45 Tumor biology, genetics and personalized medicine - BK
Break
13:30-14:15 Written exam

kurzuskód	felelős oktató	elnevezés	kredit	oktató intézet
OPEL_A-141/1993_KEG1	**Dr. Kemenesi, Gábor**	Biosafety training course	6	National Laboratory of Virology
tematika	The primary goal of the Biosafety Training Course is to prepare professionals for safe and compliant work in high-containment laboratories through a combination of theoretical knowledge and hands-on practice. Participants gain a comprehensive understanding of biosafety levels, risk groups, relevant regulations, and international standards, which are essential for working with infectious agents. The training emphasizes core skills such as risk assessment, decontamination protocols, and the correct use and maintenance of personal protective equipment. It also offers practical experience in biosafety cabinet use and laboratory procedures in BSL-2 to BSL-4 environments, including simulations in positive pressure suits. Ultimately, the course strengthens global biosafety capacity and fosters preparedness for real-world biological risks and emergencies.			

Declaration of the course:

Semester: fall
Application deadline: **one week before the beginning of the semester**
Application: **name:** Dóra Király
telephone: +36302905742
email: vnl@pte.hu

Maximum number of attending students: **8**
Criteria of acceptance in case of overbooking: declaration of acceptance from the leader of the course

Time frame of education total hours of the course: 45
number of lectures per week: 2
number of practices per week: 1,5

Type of examination: written
Type of remedial exam: written

Criteria of accepting the course (exams, maximum number of absence, etc.).:
- maximum number of absence: 1
- minimum 60% on both exams (2)
- completed practice parts

Opportunities for making up for non-attendance: one time, based on lecturer's consultation

List of resources (book, note, other) **required for learning the curriculum:**
- Slides and notes of the course
- WHO LBM 4th edition core document and the subject specific monographs:

    - Risk assessment
    - Laboratory design and maintenance
    - Biological safety cabinets and other primary containment devices
    - Personal protective equipment
    - Decontamination and waste management
    - Outbreak preparedness and resilience
- CDC BMBL 6th edition
- CEN Workshop Agreement 15793: Laboratory Biorisk Management Standard
- Directive 2000/54/EC

Topics and instructors of the activities (all lectures, practices, seminars separately):

Week	Training Module	Thematic Description	Lecture/ Practice*	Duration	Lecturer
1	RG and BSL categories, most important pathogens	Overview and introducing to biosafety and basics of biosecurity. The theory of risk groups and the biosafety/containment levels	L	1×45 min	B. A. Somogyi
1	International (EU) and Hungarian regulations	This module This module explains the legal framework (inc. EU and Hungarian regulations). It explains the legal framework, permit and reporting requirements related to biological risks. Emphasis is placed on how EU directives are implemented nationally. It is essential for understanding the legal operation of biosafety laboratories and procedures.	L	1×45 min	Péter Szabó
1	Overview of the international recommendations, handbook	This module summarizes global biosafety and biosecurity recommendations including WHO, CDC-BMBL, CBH, ISO 35001 and others. It helps participants to navigate in various regulatory documents and to identify the most relevant ones. It emphasizes harmonization and compliance in international lab contexts. Highly important for cross-border collaborations.	L	1×45 min	B. A. Somogyi
2	Requirements for BSL category facilities (BSL-1/2)	The module focuses on infrastructure and good laboratory practices (GLP) in BSL-1 and BSL-2 environments. Topics include basic equipment, safety rules, and managing hazardous activities. It prepares participants for safe work with low-risk pathogens. A prerequisite for higher BSL level training.	L	1×45 min	B. A. Somogyi
2	Concepts and principles of BSL-3 facilities	This module introduces the design, operation, and practices specific to BSL-3 laboratories. It covers respiratory pathogen containment, HEPA filtration, airlocks, and PPE requirements. Emphasis is placed on routine and emergency protocols. Critical for handling airborne infectious agents.	L	1×45 min	Krisztina Leiner
2	Concepts and principles of BSL-4 facilities	Covers the history, design, and technical infrastructure of BSL-4 laboratories, including airlock systems and positive pressure suits. Emphasizes the key differences between BSL-3 and BSL-4 environments. Includes practical examples from operational BSL-4 labs worldwide. Represents the highest-level biosafety training content.	L	1×45 min	B. A. Somogyi
3	Risk Assessment and Risk management	Focus on theoretical and practical aspects of biological risk assessment, including RAS and RAM systems, hazard identification, risk analysis, and mitigation strategies. Includes evaluation of incident statistics and case studies. Emphasizes the importance of mastering documented risk assessment methodologies. Essential for establishing responsible laboratory practices.	L	3×45 min	Ágota Ábrahám
4	Requirements, use and maintenance of the PPE	Covers PPE types used in BSL-3 and BSL-4 labs, including their advantages, limitations, donning and doffing procedures, and maintenance principles. Addresses the operation of positive pressure suits, air supply systems, and fault detection. Aims to enhance personal safety during high-containment work. Includes both theoretical instruction and hands-on training.	L	1×45 min	Ágota Ábrahám
4	Material transfer, transport and packaging	Explains safe handling, transport, and packaging of samples, biological agents, and reagents. Highlights the interface between ADR, IATA regulations, and BSL-level requirements. Addresses documentation obligations related to shipment and compliance. Critical component for international collaboration and secure logistics.	L	2×45 min	B. A. Somogyi

5	Laboratory design and technical criteria	Focuses on lab infrastructure including HVAC systems, autoclaves, UPS units, and other critical equipment. Covers the layout of operational zones, airlock systems, and control checkpoints. Links design principles to practical workflows and safety requirements. Emphasizes the importance of reliable and fault-free technical systems.	L	2×45 min	B. A. Somogyi, Dr. Kornélia Kurucz
5	Basic principles in laboratory work - Biosafety cabinet	Covers the structure and classification of biosafety cabinets (Class I, II, III) and their specific applications in laboratory environments. Explains airflow dynamics, containment functions, and the role of HEPA filtration in preventing contamination. Emphasis is placed on correct working posture, proper material placement, and minimizing turbulence to maintain sterile conditions. Includes guidance on startup, shutdown, daily disinfection procedures, and routine maintenance. Highlights common errors and appropriate responses to spills and malfunctions inside the cabinet.	L	1×45 min	B. A. Somogyi
6	Decontamination methods and protocols	The module reviews the principles and applications of decontamination. Topics include disinfectant selection, contact times, compatibility, and validation methods. It also compares surface vs. liquid vs. air decontamination strategies, including autoclaving and UV-C disinfection. Participants gain skills for both routine and emergency decontamination protocols.	L	1×45 min	Krisztina Leiner, Ábrahám Ágota
6	Basic principles in laboratory work (BSL-2)	The module introduces key safety concepts required for working in BSL-2 environments. It covers good microbiological practices, PPE usage, hand hygiene, sharps management, and spill response. WHO LBM protocols are reviewed to reinforce behaviour-based safety. The training is foundational before progressing to higher containment labs.	L	1×45 min	Krisztina Leiner
7	Basic principles in laboratory work (BSL-3)	Introduces the core laboratory practices required in BSL-3 environments, focusing on containment, personal protection, and procedural discipline. Emphasizes the use of appropriate PPE, entry and exit protocols, and the handling of airborne or high-risk pathogens. Covers the decontamination steps, and emergency procedures tailored to BSL-3 settings. Aims to ensure safe, compliant, and efficient work under enhanced biosafety conditions.	L	1×45 min	B. A. Somogyi
7	Basic principles in laboratory work (BSL-4)	Provides an overview of routine operations and behaviour expected in BSL-4 laboratories, including adherence to strict containment protocols. Emphasizes coordination, communication, and precision while working in positive pressure suits. Covers handling of high-consequence pathogens, sterile technique adaptation, and risk minimization during complex tasks. Prepares participants for consistent, compliant work in maximum containment settings.	L	2×45 min	B. A. Somogyi
7	Decontamination methods and protocols (BSL-3/4)	Specific disinfection and sterilization strategies adapted for BSL-3 and -4 environments are covered. Includes chemical showers, incineration, and waste processing systems. This lecture integrates manual and automated decontamination processes. Training ensures readiness for emergency cleanups and exit procedures.	L	1×45 min	B. A. Somogyi
8	Field Biosafety 1: Field labs and sampling	Field operations for research, humanitarian or military purposes. Relevance of these deployments and available tools. Most important safety and security protocols and discussion about real-life scenarios. Inactivation, sampling and analysis of samples. Introduction to field-deployable personal protective equipment for biological hazards.	L	1×45 min	Dr. habil. Gábor Kemenesi
8	Field Biosafety 2: Rapid response and civil protection	EU Civil Protection Mechanisms – an introduction. Discussion of the relevance of mobile laboratories in civil protection.	L	1×45 min	Dr. habil. Gábor Kemenesi
8	Lecture exam	A formal written exam assessing theoretical biosafety and biosecurity knowledge. Topics include RG/BSL classifications, PPE, decontamination, incident management, and regulations. A minimum 60% score is required to proceed with practice-based modules. Evaluates understanding of all prior modules.	L	1×45 min	B. A. Somogyi

9	Pre-work procedures (BSL-2)	Covers preparatory steps required before beginning laboratory work in BSL-2 environments. Includes completion of safety checklists, verification of equipment readiness, and review of experimental protocols. Emphasizes risk awareness, reagent preparation, and personal protective measures. Aims to ensure all conditions are safe and compliant before initiating any laboratory activity.	P	1×45 min	B. A. Somogyi, Krisztina Leiner, Ábrahám Ágota
9	Pre-work procedures (BSL-3)	Participants simulate administrative and procedural workflows before entering BSL-3 zones. Topics include documentation, equipment integrity checks, and PPE validation. The training serves as a buffer between planning and practice.	P	1×45 min	B. A. Somogyi, Krisztina Leiner, Ábrahám Ágota
9	Pre-work procedures (BSL-4)	Details the critical preparatory steps prior to entering a BSL-4 laboratory. Includes suit integrity checks, air supply verification, checklist-based administrative approvals, and communication protocols. Emphasizes psychological readiness, emergency planning, and coordination with technical support staff. Ensures full compliance with containment and procedural requirements before initiating high-risk work.	P	1×45 min	B. A. Somogyi, Krisztina Leiner, Ábrahám Ágota
10	Biosafety Cabinet practice	Hands-on training in biosafety cabinet operation under realistic laboratory conditions. Focuses on safe material handling, sterile technique, and contamination control. Trainees perform practical tasks such as pipetting, waste disposal, and equipment placement while maintaining airflow integrity. Designed to reinforce proper habits and prepare participants for independent cabinet work.	P	4×45 min	B. A. Somogyi, Krisztina Leiner, Ábrahám Ágota
11	PPE and work practice in BSL-2	Emphasizes hands-on application of personal protective equipment and routine biosafety procedures in BSL-2 settings. Trainees practice proper donning and doffing techniques, safe movement within the lab, and clean-to-dirty workflow. Includes practical tasks such as handling biological materials, decontaminating surfaces, and managing sharps containers. Designed to reinforce safe, consistent laboratory behaviour through repetition and supervision.	P	4×45 min	B. A. Somogyi, Krisztina Leiner, Ábrahám Ágota
12	PPE and work practice in BSL-3	Focuses on practical use of PPE and safe working techniques specific to BSL-3 laboratories. Includes step-by-step training in gowning procedures, respirator fitting, and navigating confined spaces while maintaining containment. Trainees perform routine laboratory tasks under supervision, such as material handling inside biosafety cabinets and emergency response drills. Emphasizes precision, contamination avoidance, and confident movement in a high-containment environment.	P	4×45 min	B. A. Somogyi, Krisztina Leiner, Ábrahám Ágota, Dr. Kornélia Kurucz
13	PPE and work practice in BSL-4	Intensive practical training in the use of positive pressure suits and full-body PPE required in BSL-4 laboratories. Covers suit inspection, donning and doffing routines, and air supply management. Trainees simulate complex laboratory tasks under containment, including biosafety cabinet work, communication protocols, and movement through airlocks. Emphasizes precision, endurance, and safe execution of procedures in a high-risk, restricted environment.	P	4×45 min	B. A. Somogyi, Krisztina Leiner, Ábrahám Ágota, Dr. Kornélia Kurucz
14	Final exam	Written assessment covering the full theoretical and practical content of the training program. Includes scenario-based questions on biosafety principles, PPE use, risk assessment, emergency response, and laboratory procedures. A minimum score of 60% is required to successfully complete the training.		2×45 min	B. A. Somogyi

*: The practical modules must be completed individually, therefore the allocated time frame has been defined per person.

code	instructor in charge	title	credit	host department
OPMU_B-130/1993_KEA1	**Dr. Kengyel, András**	Rapid Kinetic Methods in	2	Department of Biophysics

		Biology		
description	The majority of biological processes are governed by structural and kinetic properties. Therefore, a comprehensive understanding of these latter aspects is of critical importance for the proper description of biological systems. The objective of this course is to provide knowledge and experience in the principles and basic applications of rapid kinetic methods, which are suitable for following biochemical processes on the millisecond timescale. In the second part of the course, the PhD students learn practical applications involving the design of rapid kinetic experiments, performing measurements and analyzing the data.			

Declaration of the course:

Semester: spring
Application deadline: 28. February
Application: **name:** Dr. Kengyel, András Miklós
telephone: 31651
email: andras.kengyel@aok.pte.hu

Maximum number of attending students: 10
Criteria of acceptance in case of overbooking: order of application

Time frame of education total hours of the course: 14
number of lectures per week: 2
number of practices per week: 2
Remark: The lectures and practices will be held in a cluster over two consecutive days.

Type of examination: written
Type of remedial exam: written

Criteria of accepting the course (exams, maximum number of absences, etc.).: Maximal absence of 3 hours, completing the written exam.
Opportunities for making up for non-attendance: Should be discussed with the lecturer.

List of resources (book, note, other) **required for learning the curriculum:**
Pilling, M.J., Seakins P.W.: Reaction Kinetics (Oxford University Press, 1995)
Keszei, E. Reaction Kinetics: An Introduction. (Springer, 2021). doi.org/10.1007/978-3-030-68574-4
Gutfreund, H.: Kinetics for the Life Sciences, Cambridge University Press, ISBN 052148586X.

Topics and instructors of the activities (all lectures, practices, seminars separately):
Lectures:
1. Mathematical basics (Dr. Bukovics Péter)
2. The principles of enzyme kinetics (Dr. Bukovics Péter)
3. Theoretical bases of spectroscopic methods (Dr. Ujfalusi Zoltán)
4. Mixing-based and relaxation methods (Dr. Kengyel András)
5. The setup and function of the stopped flow instrument (Dr. Ujfalusi Zoltán)
6. The application of stopped flow methods on model systems (Dr. Kengyel András)
7. Femto-biological methods (Dr. Lukács András)
8. Mathematical analysis of results (Dr. Ujfalusi Zoltán)
Practices
1. Basic stopped-flow experiments, dead time (Dr. Kengyel András)
2. Characterizing contractile proteins using rapid kinetic techniques (Dr. Ujfalusi Zoltán)
3. Measurements using transient absorption systems (Dr. Lukács András)

code	instructor in charge	title	credit	host department
OPKL_B-149/1993_LEZ1	**Dr. Lelovics, Zsuzsanna**	Trends in Nutrition Science	4	Department of Public Health

				Medicine
description	**Trends in Nutrition Science**			

Declaration of the course:

Semester: fall
Application deadline: **30th September**
Application: **name: Dr. Lelovics, Zsuzsanna**
telephone: (+36 30) 2882889
email: **lelovics@yahoo.com**

Maximum number of attending students: **12**
Criteria of acceptance in case of overbooking: order of application

Time frame of education total hours of the course: **28**
number of lectures per week: **2**

Type of examination: oral
Type of remedial exam: written

Criteria of accepting the course (exams, maximum number of absence, etc.): successful exam, maximum absence: 4 hours

Topics and instructors of the activities (all lectures, practices, seminars separately):

1–3. Current National Nutritional (Hungarian) Surveys: Macronutrient Intake and Habits. *Dr. Lelovics, Zsuzsanna*
4–6. Characteristics of Healthy Eating in Child- and Adulthood. *Dr. Lelovics, Zsuzsanna*
7–8. Updates in Nutrition Prevention for Children and Adults. *Dr. Lelovics, Zsuzsanna*
9–10. Nutrition in Old Age. *Dr. Lelovics, Zsuzsanna*
11. Current Research. 1. Macronutrient Intake. *Dr. Lelovics, Zsuzsanna*
12. Current Research. 2. Micronutrient Intake. *Dr. Lelovics, Zsuzsanna*
13–14. Current Research. 3. Fluid Needs and Fluid Intake. *Dr. Lelovics, Zsuzsanna*
15–16. Validated Nutritional Condition Screening Methods. *Dr. Lelovics, Zsuzsanna*
17. National and International Nutritional Condition Screening Results. *Dr. Lelovics, Zsuzsanna*
18–19. Updates on the Dietary Supplements Market. *Dr. Lelovics, Zsuzsanna*
20. Updates on the New Foods Market. *Dr. Lelovics, Zsuzsanna*
21–22. Diets of Those Following Nutritional Trends. *Dr. Lelovics, Zsuzsanna*
23–24. The Influence of the Internet and Media on Nutrition. Summary. *Dr. Lelovics, Zsuzsanna*

code	instructor in charge	title	credit	host department
OPKL_B-149/1993_LEZ2	**Dr. Lelovics, Zsuzsanna**	Nutrition and Prevention	4	Department of Public Health Medicine
description	**Nutrition and Prevention**			

Declaration of the course:

Semester: spring
Application deadline: 28th February
Application: **name: Dr. Lelovics, Zsuzsanna**
telephone: (+36 30) 2882889
email: **lelovics@yahoo.com**

Maximum number of attending students: **12**
Criteria of acceptance in case of overbooking: order of application

8. Time frame of education total hours of the course: **28**

number of lectures per week: **2**
number of practices per week:
number of seminars per week:

Type of examination: oral
Type of remedial exam: written

Criteria of accepting the course (exams, maximum number of absence, etc.): successful exam, maximum absence: 4 hours

Topics and instructors of the activities (all lectures, practices, seminars separately):
1–2. The Role of Nutrition in Cardiovascular Disease Prevention. *Dr. Lelovics, Zsuzsanna*
3–4. The Role of Nutrition in Diabetes Prevention. *Dr. Lelovics, Zsuzsanna*
5–6. The Role of Nutrition in Cancer Prevention. *Dr. Lelovics, Zsuzsanna*
7–8. The Role of Nutrition in Maintaining Gastrointestinal Health. *Dr. Lelovics, Zsuzsanna*
9. The Role of Nutrition in Maintaining Gut Microbiota Balance. *Dr. Lelovics, Zsuzsanna*
10–11. The Role of Nutrition in Mental Health Maintenance. *Dr. Lelovics, Zsuzsanna*
12–13. The Role of Nutrition in Neurological Disease Prevention. *Dr. Lelovics, Zsuzsanna*
14–15. The Role of Nutrition in Strengthening the Immune System. *Dr. Lelovics, Zsuzsanna*
16–18. The Role of Nutrition in Weight Regulation. *Dr. Lelovics, Zsuzsanna*
19. The Role of Nutrition in Improving Sleep Quality. *Dr. Lelovics, Zsuzsanna*
20. The Protective Effects of the Mediterranean Diet. *Dr. Lelovics, Zsuzsanna*
21–22. Protective and Harmful Effects of Following Nutritional Trends. *Dr. Lelovics, Zsuzsanna*
23. Dietary Habits and Protective vs. Harmful Macronutrient Intake. *Dr. Lelovics, Zsuzsanna*
24. Dietary Habits and Protective vs. Harmful Micronutrient Intake. Summary. *Dr. Lelovics, Zsuzsanna*

code	instructor in charge	title	credit	host department
OPGY_A-144/1994_LEB1	**Dr. Lemli, Beáta**	Sustainability in medical and pharmaceutical research	3	Institute of Pharmaceutical Technology and Biopharmacy
description	This course aims to provide students with a comprehensive understanding of the concept of sustainability and its relevance within medical and pharmaceutical research, considering the contribution of the healthcare sector to climate change and the concept of sustainable healthcare. Students will explore the environmental, economic, social, and ethical dimensions of sustainability, the necessity of a sustainability paradigm shift, and practical opportunities for their integration into their own research projects and education. By the end of the course, students will be able to consider sustainability aspects in research design, execution, and the application of results, and will recognize the importance of integrating sustainability into medical and pharmaceutical education and the challenges ahead.			

Declaration of the course:
Semester: both
Application deadline: 2nd week of the semester

Application: **name:** Dr. Lemli Beáta
telephone: 28803
email: lemli.beata@gytk.pte.hu

Maximum number of attending students: 10

Criteria of acceptance in case of overbooking: order of application

Time frame of education total hours of the course: 21
number of lectures per week: 3

Type of examination: written
Type of remedial exam: written

Criteria of accepting the course (exams, maximum number of absence, etc.).: successful exam, at least 70 % attendance in lectures
Opportunities for making up for non-attendance: Personal consultation

List of resources (book, note, other) **required for learning the curriculum:** lecture material, articles proposed at the lecture

Topics and instructors of the activities (all lectures, practices, seminars separately):
1–4. Introduction: sustainability and healthcare (Dr. Lemli Beáta)

1. The concept and dimensions of sustainability: environmental, economic, social, and ethical aspects
2. The environmental impacts of healthcare: emissions, resource utilization, waste generation
3. The impact of climate change on healthcare and the weakness of healthcare systems
4. Sustainable healthcare: principles, goals, and international examples

5–16. Integrating sustainability into the research process (Dr. Lemli Beáta)

5. Integrating the sustainability perspective into the research design phase
6. Sustainable research questions and objectives: relevance and social benefit
7. Research methods from a sustainability perspective
8. Resource-efficient laboratory practices: environmental considerations in research
9. Reducing the environmental footprint during research: energy, water, material use
10. Ethical issues in sustainable research: alternatives to animal testing, human participation
11. Social and economic sustainability in research: accessibility and equity
12. Green chemistry and sustainable molecular design in pharmaceutical research
13. Research on sustainable sources of active pharmaceutical ingredients
14. Circular approaches in pharmaceutical research and development
15. Application of sustainability indicators and metrics in research
16. Sustainability impact assessment in research projects: methodologies and frameworks

17–21. Application, Training, Future (Dr. Lemli Beáta)

17. Integrating sustainability into research outcomes and innovations
18. Research funding and grant strategies from a sustainability perspective
19. Incorporating sustainability into medical and pharmaceutical education: the connection between research and education
20. Interdisciplinary collaboration in sustainable research
21. Future directions and challenges: sustainable research in the 21st century

code	instructor in charge	title	credit	host department
OPKL_B-149/1993_LOS1	**Dr. Lohner, Szimonetta**	Introduction to systematic review and meta-analysis	4	Department of Public Health Medicine
description	A systematic review is a means of identifying, evaluating and interpreting all available research relevant to a particular research question. In contrast to the traditional or narrative literature reviews, systematic literature reviews are using a rigorous and well-defined approach for summarizing available scientific literature. As part of a systematic review data are often quantitatively summarized in a meta-analysis. Systematic reviews are important for both the			

	medical practice and medical research, as they facilitate the formulation of timely professional recommendations and help to make the decision whether further trials on a specific clinical question are necessary. During the course, interactive lectures will enable participants to gain the knowledge and skills necessary for the effective planning of a systematic review, for carrying out structured literature searches, for extracting data effectively from publications, for assessing risk of bias, for performing a meta-analysis, and for assessing the certainty of available evidence.

Declaration of the course:

Semester: spring
Application: **name:** Dr. Lohner, Szimonetta
telephone: +36 30 250 1463
email: lohner.szimonetta@pte.hu

Maximum number of attending students: 15
Criteria of acceptance in case of overbooking: order of application

Time frame of education total hours of the course: 28 (21 lectures, 7 practices)

Type of examination: oral
Type of remedial exam: oral

Criteria of accepting the course (exams, maximum number of absence, etc.).:
Maximum of 15 % absence allowed

Opportunities for making up for non-attendance:
Missing not more than 4 hours may be amended by studying at home and answering specific questions of the tutor.

List of resources (book, note, other) **required for learning the curriculum:**
Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA (editors). *Cochrane Handbook for Systematic Reviews of Interventions* version 6.3 (updated February 2022). Cochrane, 2022. Available from www.training.cochrane.org/handbook.
Higgins JPT, Thomas J, Chandler J, Cumpston M, Li T, Page MJ, Welch VA (editors). *Cochrane Handbook for Systematic Reviews of Interventions*. 2nd Edition. Chichester (UK): John Wiley & Sons, 2019.

Topics and instructors of the activities (all lectures, practices, seminars separately):
Lectures:
1. Role of scientific literature in the daily health care practice
2. Effective literature searching for a focused question
3. Definition and importance of systematic reviews.
4. How to read a systematic review? How to interpret a forest plot?
5. Writing a systematic review following Cochrane methods
6. Defining a review question using PICOS
7. Searching for studies: Developing a search strategy.
8. The MEDLINE database. The Cochrane Library
9. Systematic literature searching in other databases. Searching clinical trial registers (clinicaltrials.gov, EU Clinical Trials Register, WHO ICTRP). Searching for grey literature
10. Selecting studies. The PRISMA flow-chart
11. Using software supporting systematic literature searching and screening
12. Collecting data from included studies for systematic reviews of interventions
13. Analysing dichotomous outcomes

14. Analysing continuous outcomes
15. Analysing other outcomes and study designs
16. Introduction to meta-analysis with RevMan. Useful features in RevMan
17. Heterogeneity
18. What is risk of bias?
19. Reporting biases. Funnel plots
20. Assessing the certainty of evidence (GRADE)
21. Evidence as part of medical decision-making. Systematic reviews in clinical trial planning

Practices:

1. Systematic literature searching in MEDLINE (via Pubmed and via Ovid Medline)
2. Data collecting exercise
3. Introduction to meta-analysis with RevMan – part I (Setting up a new review, analysing dichotomous outcomes)
4. Introduction to meta-analysis with RevMan – part II (Analysing continuous outcomes)
5. Assessing risk of bias with Cochrane RoB 2.0 tool – part I
6. Assessing risk of bias with Cochrane RoB 2.0 tool – part II
7. GRADE exercise

code	instructor in charge	title	credit	host department
OPMU_B-130/1993_LUA3	**Dr. Lukács, András**	Functional Protein Dynamics: the Application of Luminescence Spectroscopic Methods	4	Department of Biophysics
description	The function of proteins and other macromolecules is governed by their function and interactions. These functions are manifested in close coupling with their actual conformational state and dynamic properties. A powerful arsenal of methods to characterise these properties is offered by luminescence spectroscopy. The course aims to provide the basic principles of these methods and will also give insights into the advantages and limitations of their applications.			

Declaration of the course:

Semester: spring
Application: **name:** dr- Lukács, András
telephone: 536267
email: andras.lukacs@aok.pte.hu

Maximum number of attending students: 12
Criteria of acceptance in case of overbooking: order of application

Time frame of education total hours of the course: 14
number of lectures per week: 1
number of practices per week: 3

Type of examination: written
Type of remedial exam: oral

Criteria of accepting the course (exams, maximum number of absence, etc.).: successful exam and no more than 3 absences

List of resources (book, note, other) **required for learning the curriculum:** chapters of the Medical Biophysics book is advised

Topics and instructors of the activities (all lectures, practices, seminars separately):
Lectures:
Reaction kinetics, enzyme kinetics;
Luminescence spectroscopy;
Practicals:
Fluorescence spectroscopy;
Fluorescence Resonance Energy Transfer;
Fluorescence quenching;
Polarisation, anisotropy;

code	instructor in charge	title	credit	host department
OPMU_B-130/1993_LUA4	**Dr. Lukács, András**	Classical and superresolution microscopy methods: basics and practical applications	4	Nano-Bio-Imaging Core Facility/ Department of Biophysics
description	The primary goal of the course is to introduce the basics of various microscopic techniques, whether traditional (confocal) or considered super-resolution (SIM, STED, PALM/STORM) applications. Beyond the theoretical principles of how these instruments work, the course also covers the practical use of different microscopes and sample preparation techniques. By the end of the course, students should be able to decide which sample preparation and microscopy technique would give the best results for a given sample.			

5. Declaration of the course:

Semester: fall
Application deadline: 01 October
Application: **name:** Dr. András Lukács
telephone: 536267
email: andras.lukacs@aok.pte.hu

Maximum number of attending students:12
Criteria of acceptance in case of overbooking: order of application

Time frame of education total hours of the course: 28 (7 weeks)
number of lectures per week:1
number of practices per week:3

Type of examination: oral
Type of remedial exam: oral

Criteria of accepting the course (exams, maximum number of absence, etc.).: successful exam and no more than 3 absences
Opportunities for making up for non-attendance: none

List of resources (book, note, other) **required for learning the curriculum:** chapters of the Medical Biophysics book is advised

Topics and instructors of the activities (all lectures, practices, seminars separately):
Lectures:

1. Basics of fluorescence: Prof. Dr. András Lukács
2. Fluorescent probes: Prof. Dr. András Lukács
3. Basic concepts of microscopy: Dr.Szilvia Barkó
4. Confocal microscopy: Dr.Tibor Jánosi
5. STED microscopy: Dr.Géza Makkai
6. SIM: Dr.Szilvia Barkó
7. STORM/PALM: Dr.Géza Makkai/ Dr.Tibor Jánosi

Practices:

1. Basics of sample preparation (Fixation, pro and cons, antifading agents): Dr.Szilvia Barkó
2. Spectroscopy and application of fluorescent probes: Dr.Tamás Huber
3. Fluorescence microscopy basics: Dr.Szilvia Barkó (Olympus IX 71)
4. Confocal microscope: Dr.Tibor Jánosi
5. STED microscope: Dr.Géza Makkai
6. SIM: Dr.Szilvia Barkó
7. STORM/PALM: Dr.Géza Makkai/ Dr.Tibor Jánosi

code	**instructor in charge**	title	credit	host department
OPKL_B-149/1993_MAE1	**Dr. Marek, Erika**	Medical and healthcare aspects of international migration	4	Department of Operational Medicine
tematika	During this multidisciplinary course students will learn of the medical and healthcare aspects and consequences of the increased migration (especially irregular migration) towards Europe from various aspects. Participants will gain in knowledge regarding the specific health needs of the newcomers arriving from distant geographic areas and also of the specific aspects of their healthcare assistance: legislation and their access to care, medical screening examinations and their results from the previous years, occupational health aspects and methods of age-assessment. Students will also learn of the fundamentals of migrant-sensitive health-care systems and intercultural aspects of care, as well as the psychosocial and mental health needs of victims of trafficking.			

Declaration of the course:

Semester: autumn
Application deadline: 30th September
Application: **name:** dr. Marek, Erika
telephone: 35335
email: erika.marek@aok.pte.hu

Maximum number of attending students: 10 students
Criteria of acceptance in case of overbooking: declaration of acceptance from the leader of the course

Time frame of education total hours of the course: 28
number of lectures per week: 28

Type of examination: written (essay on a previoulsy discussed topic)
Type of remedial exam: written (essay on a previoulsy discussed topic)

Criteria of accepting the course (exams, maximum number of absence, etc.).: Maximum of 15 % absence allowed

Opportunities for making up for non-attendance: Based on independent consultation with course leader

List of resources (book, note, other) **required for learning the curriculum:**

- A. Rundle, M. Carvalho, M. Robinson. Cultural Competence in Health Care: A Practical Guide 2nd Edition, ISBN: 978-0-7879-6221-0
- M. B. Schenker (Ed.), X. Castaneda (Ed.), A. Rodriguez-Lainz (Ed.) Migration and Health: A Research Methods Handbook Paperback -2014 Publisher: University of California Press; 1 ed. ISBN-10: 0520277953
- Felicity Thomad (Ed.). Handbook of Migration and Health. E.Elgar, 2016, ISBN: 9781784714772

Topics and instructors of the activities (all lectures, practices, seminars separately):

Introduction. Migration as global phenomenon: history, terms, recent trends of regular and irregular migration. dr. Erika Marek

Migration-health as a new, interdisciplinary field of research: overview of the health and public health aspects of migration stages (countries of origin, transit and destination countries) dr. Erika Marek

Health assessment of migrants in Hungary: results from the refugee reception centres (2007-2015, Debrecen) in reflection to general national epidemiological indicators and ECDC screening recommendations. dr. Erika Marek

National legislation of healthcare for migrants. Differing legal regulations and entitlements to healthcare for migrants in the EU. dr. Zoltán Katz

Vaccine-preventable diseases (VPDs) and their relation to migration, significance of vaccinations in the global health security program. dr. Zoltán Katz

Occupational-health aspects of migration I-II. Healthy-migrant workforce and occupational-health of the care providers (border-police staff, administrative staff, healthcare workers, etc.). dr. Erika Marek

Psycho-social aspects of migration and principals of providing care for victims of trafficking and torture. dr. Lilla Hárdi/Cordelia Foundation

Principals of migration-health in reflection to current WHO and ECDC recommendations. Introduction of Amsterdam Declaration. dr. István Szilárd

Migrants' barriers in accessing healthcare and some 'Best Practices' in overcoming barriers and providing migrant-sensitive healthcare. dr. Erika Marek

Intercultural competence in healthcare. Overcoming linguistic and cultural barriers: cultural mediation and 'how to work together with medical interpreter?' dr. Erika Marek

Prejudice and discrimination towards migrant and other minority populations in healthcare: their effects on patients' health and access to healthcare and 'how to overcome? (tips)' dr. Erika Marek

Health promotion and health education in migrant communities. dr. Erika Marek

Consolidation, final assessment. dr. Erika Marek

code	instructor in charge	title	credit	host department
OPKL_A-442/2000_MAS2	**Dr. Márton, Sándor**	The dangers of morbid obesity	2	Department of Anaesthesiology and Intensive Therapy
description	Morbid obesity is one of the most common diseases of our time and is now recognised by the WHO as a disease in its own right. Along with known comorbidities such as hypertension, cardiac decompensation, restrictive lung disease, arthritic disease, it is also often associated with chronic immune disease. It is the most common pathological condition in pregnancy, affecting both the expectant mother and the newborn. Bariatric surgery is increasingly used to treat it above a certain BMI. The aim of this course is to review the pathophysiology and complex management of morbid obesity.			

Declaration of the course:

Semester: both
Application: **name:** dr. Márton, Sándor
telephone:+36309369559
email: marton.sandor. pte.hu

Maximum number of attending students:14
Criteria of acceptance in case of overbooking: declaration of acceptance from the leader of the course
Time frame of education total hours of the course:14
number of lectures per week:1

Type of examination: oral
Type of remedial exam: oral

Topics and instructors of the activities (all lectures, practices, seminars separately):
1. Dr. Kriszta Tóth Márton Pathology of morbid obesity
2. Dr. Kriszta Tóth Co-morbidities of morbid obesity
3. Dr. Sándor Lénárd Chronic inflammation of chordomas
4. Dr. Sándor Márton Treatment options for morbid obesity

code	instructor in charge	title	credit	host department
OPKL_A-319/1995_MGA1	**Dr. Molnár, Gergő Attila**	Systemic diseases and renal affection: renocardiac, cardiorenal, pulmorenal and other syndromes	1	2nd Department of Internal Medicine and Nephrological-Diabetes Centre
description	The course would like to cover beyond the diseases affecting the kidneys and the heart or the kidneys and the lungs (renocardial, cardiorenal and pulmorenal syndromes) also other systemic diseases that affect the kidneys. Nephrology is a subdiscipline of internal medicine with many interfaces towards other fields. These interfaces include diseases that also involve other organs beyond the renal affection. Among others, we would like to cover the five major classic types of cardiorenal/renocardial syndromes, as well as other models describing the interaction of kidney and the heart. we would cover the pulmorenal syndromes as well as renal involvement in systemic autoimmune diseases and other systemic diseases.			

Declaration of the course:
Semester: autumn
Application deadline: September 6,
Application: **name:** Dr. Molnár, Gergő Attila
telephone: +36309757818
email: molnar.gergo@pte.hu

Maximum number of attending students: 6
Criteria of acceptance in case of overbooking: declaration of acceptance from the leader of the course
Time frame of education total hours of the course: 7
number of seminars per week: 1

Type of examination: oral
Type of remedial exam: oral

Criteria of accepting the course (exams, maximum number of absence, etc.).: oral exam, maximum allowed absence: 30% (2 occasions)

Opportunities for making up for non-attendance: none

List of resources (book, note, other) **required for learning the curriculum:**
Notes taken individually during the seminars
Nephrology and hypertension lecture notes for medical students (Second Department of Medicine and Nephrology-Diabetes Centre, University of Pécs, Medical School/Clinical Centre)
Comprehensive Clinical Nephrology, 6th Edition, Elsevier, 2019
Brenner and Rector's The Kidney, 11th Edition, Elsevier, 2019

Topics and instructors of the activities (all lectures, practices, seminars separately):
1. Renal involvement in systemic diseases (Dr. Gergő A. Molnár)
2. Cardiorenal syndromes (CRS 1-2) (Dr. Gergő A. Molnár)
3. Renocardial syndromes (CRS 3-4) (Dr. Gergő A. Molnár)
4. Other types of cardiorenal syndrome (CRS5) and potential bidirectional connections (Dr. Gergő A. Molnár)
5. Pulmorenal syndromes, clinical decision-making (Dr. Gergő A. Molnár)
6. Renal involvement in systemic immune diseases (Dr. Gergő A. Molnár)
7. Renal involvement in other systemic diseases and as part of a multi-organ failure syndrome (Dr. Gergő A. Molnár)

code	instructor in charge	title	credit	host department
OPEL_A-138/1993_PSA1	**Dr. Pál-Sonnevend, Ágnes**	Microbiology Journal Club	1	Medical Microbiology and Immunology
description	This course is intended to provide skill for the doctoral student conducting research in microbiology to critically appraise and evaluate publications relevant to their field of interest. Each student taking the course will choose a publication of his/her interest or relevant to the field of research and give a presentation in which he/she demonstrates the findings, and the methodology used in the publication. Furthermore, the student must evaluate whether the methodology used was appropriate, sufficient to prove the findings, whether the conclusions drawn in the publication were supported with the findings, and whether regarding the previously mentioned points or of ethical aspects any criticism could be raised. As an outcome, the students will be able to critically appraise publications and also improve their presentation skills.			

Declaration of the course:
Semester: fall
Application deadline: End of first week of the fall semester.
Application: **name:** Prof. Pál-Sonnevend Ágnes
telephone: 536-000/ ext. 31911
email: pal.agnes@pte.hu

Maximum number of attending students: 6
. Criteria of acceptance in case of overbooking: declaration of acceptance from the leader of the course

Time frame of education total hours of the course: 7
number of seminars per week: 1

Type of examination: oral
Type of remedial exam: oral

Criteria of accepting the course (exams, maximum number of absence, etc.).: attendance of 80%, and getting a score of minimum 7 out of 10 for the presentation

Rubric for evaluation:
Explaining the aims, materials and methods and results of the study for naïve audience max. 3 points
Critically evaluating the findings and conclusions max. 3 points
Quality of the presentation max. 2 points
Ability to answer questions raised by the audience max. 2 points

Opportunities for making up for non-attendance: no
List of resources (book, note, other) **required for learning the curriculum:** publications chosen by the students and agreed upon by the course instructor

Topics and instructors of the activities (all lectures, practices, seminars separately):
On each occasion a pre-agreed publication will be discussed as outlined above.

code	instructor in charge	title	credit	host department
OPEL_A-137/1993_PEL1	**Dr. Péczely, László Zoltán**	Scientific cognition, inference, and learning	4	Department of Physiology
description	What are the possible paths of scientific cognition, and how are they related to one another? What is the difference between deductive and inductive inference? How is the abstract philosophical problem of cognition connected to the learning processes of animals? What are the similarities and differences between the learning of biological systems (such as animals and humans) and machine learning? This course aims to address these and similar questions. In the course, we will explore deductive logic and the structure of axiomatic systems, as well as the fundamentals of inductive inference. Additionally, we will discuss the basics of probability theory, statistical inference, statistical learning theory, the relationship between models and reality, the issue of model validity, the main mathematical models, the learning mechanisms of biological systems, and machine learning algorithms.			

Declaration of the course:
Semester: both
Application deadline: 15th of October and 15th of March
Application: name: Dr. Péczely László Zoltán
email: laszlo.peczely@aok.pte.hu

Maximum number of attending students: 10
Criteria of acceptance in case of overbooking: order of application

Time frame of education total hours of the course: 30
number of lectures per week:5

Type of examination: oral
Type of remedial exam: oral

Criteria of accepting the course (exams, maximum number of absence, etc.).: successful exam
Opportunities for making up for non-attendance: consultation

List of resources (book, note, other) **required for learning the curriculum:** will be discussed and distributed in the course

Topics and instructors of the activities (all lectures, practices, seminars separately):
1. Introduction: Definition of Logic, Classification of Logics

2. Deductive Logic I
3. Deductive Logic II
4. Deductive Logic III
5. Structure of Axiomatic Systems I
6. Structure of Axiomatic Systems II
7. Structure of Axiomatic Systems III
8. The Problem of Induction: The Relationship Between Induction and Deduction
9. Summary of Calculus: Differential and Integral Calculus
10. Probability Theory I
11. Probability Theory II
12. Probability Theory III
13. Statistical Inferences I
14. Statistical Inferences II
15. Statistical Inferences III
16. The Relationship Between Model and Reality: The Question of Model Validity
17. Mathematical Models I: Functions and Function Spaces
18. Mathematical Models II: Functions and Function Spaces
19. Mathematical Models III: Functions and Function Spaces
20. Mathematical Models IV: Differential Equations
21. Mathematical Models V: Differential Equations
22. Mathematical Models VI: Differential Equations
23. Learning Processes of Biological Systems I
24. Learning Processes of Biological Systems II
25. Artificial Intelligence, Machine Learning, and Learning Mechanisms of Biological Systems
26. Machine Learning I: Unsupervised Learning
27. Machine Learning II: Supervised Learning
28. Machine Learning III: Supervised Learning
29. Machine Learning IV: Reinforcement Learning
30. General Framework for Learning in Biological and Artificial Agents

code	instructor in charge	title	credit	host department
OPEL_A-137/1993_PKA1	**Dr. Péliné, Kovács Anita**	Stress, the role of microbiome and other effects	2	Department of Physiology
description	Nowadays, more and more nutritional, metabolic and psychological disorders are associated with stress. During the course, participants can gain a general insight into the physiology of stress and stress-related disorders. By presenting the animal models included in the research, they can get acquainted with the main directions and the advantages / disadvantages of behavioral paradigms. Furthermore, the goal is to provide an overview of current research findings, the possible relationship between changes in the gut microbiome and the development of diseases.			

Declaration of the course:

Semester: fall
Application deadline: 20, September
Application: name: Anita Péliné Kovács Dr.
telephone:38511
email:anita.kovacs@aok.pte.hu

Maximum number of attending students:10
Criteria of acceptance in case of overbooking: declaration of acceptance from the leader of the course

Time frame of education total hours of the course: 14

number of lectures per week:2

Type of examination: written
Type of remedial exam: written

Criteria of accepting the course (exams, maximum number of absences, etc.).: successful exam, maximum 3 absences
Opportunities for making up for non-attendance:-

List of resources (book, note, other) **required for learning the curriculum:** Presentations material

14. Topics and instructors of the activities (all lectures, practices, seminars separately):
1 Physiology of stress Péliné Dr. Kovács Anita
2 Advantages and disadvantages of animal models Péliné Dr. Kovács Anita
3 Animal models of physiology research Péliné Dr. Kovács Anita
4 The role of PrRP in regulation of stress responses Péliné Dr. Kovács Anita
5 Overview of diseases I.: Disturbances of growth in related to GH, thyroid gland disorders Péliné Dr. Kovács Anita
6 Overview of diseases II: Stress-related Disorders and Autism Spectrum Disorder Péliné Dr. Kovács Anita
7 Pharmacological Therapies for Stress-related Disorders and Autism Spectrum Disorder Péliné Dr. Kovács Anita
8 Animal models of metabolic diseases Péliné Dr. Kovács Anita
9 Gastrointestinal microbiomes Péliné Dr. Kovács Anita
10 The importance of gastrointestinal microbiome in therapy of diseases Péliné Dr. Kovács Anita
11 RFamide Neuropeptides (NPFF, RFRPs) in Stress-Related Psychopathologies Péliné Dr. Kovács Anita
12 RFamide Neuropeptides (Kisspeptins, QRFP) in Stress-Related Psychopathologies Péliné Dr. Kovács Anita
13 Summary Péliné Dr. Kovács Anita
14 Exam Péliné Dr. Kovács Anita

code	instructor in charge	title	credit	host department
OPGY_A-292/1994_PIE1	**Dr. Pintér, Erika**	Drug and substance abuse	2	Pharmacology and Pharmacotherapy
description	During the course we will discuss about the nature of the drug and substance abuse and dependence. We will characterize the most important groups of substances with high or moderate abuse potential. The main pharmacological groups are: opioids, CNS depressants, psychomotor stimulants and psychedelic agents.			

Declaration of the course:

Semester: spring
Application deadline: 15 February
Application: **name:** Dr. Pintér, Erika
telephone: 72-536217/35097
email: erika.pinter@aok.pte.hu

Maximum number of attending students: 10
Criteria of acceptance in case of overbooking: order of application

Time frame of education total hours of the course: 14
number of lectures per week: 2

Type of examination: written
Type of remedial exam: written

Criteria of accepting the course (exams, maximum number of absence, etc.).: exams, maximum number of absence
Opportunities for making up for non-attendance: none

List of resources (book, note, other) **required for learning the curriculum:** PPT presentation on the Coospace

Topics and instructors of the activities (all lectures, practices, seminars separately):
1. General terms,
2. Opioids, CNS depressants I.
3. CNS depressants II. (ethanol)
4. Psychomotor stimulants
5. Psychedelics
6. Practical aspects of the drug abuse (Dr. János Szemelyácz)
7. PPT presentations of the students, written exam

kurzuskód	felelős oktató	elnevezés	kredit	oktató intézet
OPKL_B-1/2008_POE2	**Dr. Pozsgai, Éva**	Scientific novelties and practical aspects of cancer screening and diagnostics	2	Institute of Primary Health Care, Department of Public Health
tematika	The aim of the course is to review the scientific novelties in cancer screening and diagnostics from a practical perspective. We describe the results of our research projects involving clinicians and general physicians working with cancer patients. The lectures will focus on the role of tumormarkers in the most common cancer diseases, as well as the relevance of the elapsed time between the appearance of the first symptoms until diagnosis in colorectal cancer patients.			

Declaration of the course:

Semester: spring
Application: **name:** dr. Pozsgai, Éva
telephone: 30/6248-176
email: pozsgay83@gmail.com

Maximum number of attending students: 15
Criteria of acceptance in case of overbooking: declaration of acceptance from the leader of the course

Time frame of education total hours of the course: 14
number of lectures per week:2

Type of examination: oral
Type of remedial exam: oral

Criteria of accepting the course (exams, maximum number of absence, etc.).: successful oral report, participation in 70% of the lectures
Opportunities for making up for non-attendance: personal consultation

List of resources (book, note, other) **required for learning the curriculum:** ppt from the lectures, recommended articles

Topics and instructors of the activities (all lectures, practices, seminars separately):
1-2: Cancer screening programs and cancer diagnostics in practice.
3-4: The role of tumormakers in the diagnosis of cancer. 1. Methodology, suitable markers in research
5-6: The role of tumormakers in the diagnosis of cancer. 2. Our research group's findings in the light of international data. Potential clinical applications.
7-8: Screening guidelines for colorectal cancer. A review of international guidelines.
9-10: The elapsed time to diagnosis in colorectal cancer patients from the general physicians' perspective. The results of a pilot study in Baranya county (I.)
11-12: Primary symptoms and the time to treatment in colorectal cancer patients. The results of a pilot study in Baranya county (II.)
13-14: The role of HPV in the development of cancer. The prognostic role of HPV in cancer. Cervical cancer screening. HPV in head and neck cancer.
12-13: The role of patient education in cancer screening. Communication with cancer patients.
Instructors: dr. Éva Pozsgai, dr. Szabolcs Bellyei, dr. András Papp

code	instructor in charge	title	credit	host department
OPGY_A-292/1994_SAZ1	**Dr. Sándor, Zoltán**	Statistical methods in medical research	3	Pharmacology and Pharmacotherapy
description	The course will present in depth the statistical methods used for analysing laboratory experiments. It aims to instill statistical thinking at all level of experimentation from the design of experiments upto the presentation of the obtained data. It extensively presents the problems arising from less then adequate understanding of statistical methods generally used in medical research, and presents modern alternative approaches to data analysis. During the course students are required to practice analysis of data obtained from real laboratory experiments. During the couse each student has to work on a written project of statistical analysis and presentation of given data and the successful completition of the course depends on the quality of the project.			

Declaration of the course:

Semester: spring
Application deadline: 5th of February
Application: **name:** Dr. Sándor Zoltán
telephone: +36204995411
email: zoltan.sandor@aok.pte.hu

Maximum number of attending students: 10
Criteria of acceptance in case of overbooking: order of application

Time frame of education total hours of the course: 22
number of lectures per week: 2 (11 weeks)

Type of examination: written
Type of remedial exam: written

Criteria of accepting the course (exams, maximum number of absence, etc.).:
active participation in the lectures, maximum 3 hours absent, successful exam
Opportunities for making up for non-attendance: none

List of resources (book, note, other) **required for learning the curriculum:**
Materials will be available to students in pdf format.

Topics and instructors of the activities (all lectures, practices, seminars separately):
1. Design of experiments
2. Data analysis and presentation
3. Descriptive statistics and parameter estimation
4. Probability
5. Basics of hypothesis testing
6. Measuring contrast
7. Regression and correlation
8. Distribution free methods
9. Bayesian satistics
10. Statistics of laboratory assays
11. Project evaluation
All lecture will be presented by Dr. Sándor Zoltán

code	instructor in charge	title	credit	host department
OPKL_A-146/1993_SAT1	**Dr. Schlégl, Ádám Tibor**	Space Medicine and Medical Challenges in Extreme Environments	3	Medical Skills Education and Innovation Centre
description	This course delves into the physiological, psychological, and medical challenges faced by humans during space exploration, with a focus on both short- and long-term missions. It examines the impact of microgravity, radiation exposure, and isolation on human health, while exploring countermeasures to mitigate these risks. In addition to medical aspects, the course addresses the planning, design, and execution of human space missions, integrating biomedical considerations into mission architecture. Students will gain practical insights into medical system design for spacecraft, telemedicine applications in space, and strategies for ensuring astronaut health during deep-space exploration. The curriculum includes lectures, hands-on simulations, and case studies from past and current human spaceflight missions.			

Declaration of the course:

Semester: spring
Application: **name:** Schlegl Adam
telephone: 72/536-800
email: schlegl.adam@pte.hu

Maximum number of attending students: 20
Criteria of acceptance in case of overbooking: order of application

Time frame of education total hours of the course: 24
number of lectures per week: 1
number of seminars per week: 1

Type of examination: written
Type of remedial exam: written

Criteria of accepting the course (exams, maximum number of absence, etc.).:
Students must pass a written exam with a minimum score of 60%. A maximum of two absences is allowed; additional absences require approval from the course leader.

Opportunities for making up for non-attendance:
Missed sessions can be made up through recorded lectures or supplementary assignments approved by the instructor.

List of resources (book, note, other) **required for learning the curriculum:**
Principles of Space Medicine by Thais Russomano
NASA Human Research Program documentation on spaceflight physiology and mission planning
ESA (European Space Agency) resources on human space exploration strategies

Topics and instructors of the activities (all lectures, practices, seminars separately):
Lecture Introduction to Space Medicine Dr. Adam Schlegl
Lecture Microgravity Effects on Physiology Dr. Adam Schlegl
Lecture Mission Design: Integrating Biomedical Considerations Invited lecturer
Seminar Emergency Medical Simulations in Space Environments Invited lecturer
Seminar Radiation Hazards in Deep-Space Missions Invited lecturer
Seminar Case Study: Planning Human Mars Missions Dr. Adam Schlegl

code	instructor in charge	title	credit	host department
OPMU_B-131/1993_SGY2	**Dr. Sétáló, György**	Steroids' alternative (nongenomic) mechanism of action	1	Department of Biology
description	This course is about steroids' mechanism of action. In the classical interpretation these ligands work as regulators of transcription. In recent decades, however, more and more information has been gathered strengthening the existence of alternative possibilities. These are executed either through membrane-bound receptors or via direct membrane effects, activating various signal transduction pathways.			

Declaration of the course:

Semester:		spring
Application deadline:		end of semester's first week
Application:	**name:**	dr. Sétáló, György Jr.
	telephone:	ext. 36216 or 31566
	email:	gyorgy.setalo.jr@aok.pte.hu

Maximum number of attending students: 20
Criteria of acceptance in case of overbooking: order of application

Time frame of education total hours of the course: 7
number of lectures per week: 0.5 (in reality 7 x 1)

Type of examination: written
Type of remedial exam: oral

Criteria of accepting the course (exams, maximum number of absence, etc.).: attending minimum 75% of the classes, then passing the exam successfully
Opportunities for making up for non-attendance: not possible

List of resources (book, note, other) **required for learning the curriculum:** discussed power point presentations will be handed out to participants after the classes

Topics and instructors of the activities (all lectures, practices, seminars separately):
1. Orientation (György Sétáló Jr.)
2. Estrogens (György Sétáló Jr.)
3. Progesterone (György Sétáló Jr.)
4. Androgens (György Sétáló Jr.)
5. Corticosteroids (György Sétáló Jr.)
6. Other, steroid-like ligands (György Sétáló Jr.)
7. Test exam (György Sétáló Jr.)

code	instructor in charge	title	credit	host department
OPMU_A-129/1993_SZE1	**Dr. Szabó, Éva**	The significance of trace elements in the context of evidence-based medicine	3	Department of Biochemistry and Medical Chemistry
description	The objective of the PhD course is to elucidate the medical implications of trace elements within the context of evidence-based medicine. Each trace element is discussed in detail: the chemical and biochemical occurrence of the trace element, the physiological significance, absorption, dietary occurrence, deficiency states, acute and chronic toxicoses. Medical significance and indications of each trace element are presented in the form of meta-analyses.			

Declaration of the course:

Semester: spring
Application deadline: end of 2nd week of spring semester
Application: **name:** dr. Szabó, Éva
telephone: 31659
email: szabo.eva.dr@pte.hu

Maximum number of attending students: 20
Criteria of acceptance in case of overbooking: declaration of acceptance from the leader of the course
Time frame of education total hours of the course: 20
number of lectures per week: 2

Type of examination: written
Type of remedial exam: written

Criteria of accepting the course (exams, maximum number of absence, etc.).: absences less than 30%, examination
Opportunities for making up for non-attendance: consultation

List of resources (book, note, other) **required for learning the curriculum:** lecture material in the form of slides

Topics and instructors of the activities (all lectures, practices, seminars separately):

1. Overview of trace elements	Szabó Éva
2-4: Medical importance of iron	Szabó Éva
5-6: Medical importance zinc	Szabó Éva
7-8: Medical importance of copper	Szabó Éva
9-10: Medical importance of iodine	Szabó Éva
11-12: Medical importance of selenium	Szabó Éva
13-14: Medical importance of molybdenum	Szabó Éva
15-16: Medical importance of manganese	Szabó Éva
17: Medical importance of fluoride	Szabó Éva
18: Medical importance of chromium	Szabó Éva
19: Medical importance of other trace elements	Szabó Éva
20: Toxic trace elements	Szabó Éva

code	instructor in charge	title	credit	host department
OPKL_B-4/2004_SZJ1	**Dr. Szalma, József**	Thermal damage of the alveolar bone,	2	Department of Oral and

			periodontium and peripheral nerves in relation to oral surgical and dental treatments		Maxillofacial Surgery
description	In several dental and oral surgery approaches rotating instruments (drills, burs) or piezoelectric preparations are applied. The course represents different clinical parameters, which can influence or reduce harmful temperatures, such as drilling parameters (spindle speed, axial loading, external-, internal or combined irrigation etc.) or drill characteristics (number and angle of cutting edges, drill material, wear etc.). Lectures discuss the methods and tools of intraoperative temperature measurements (infrared technique, thermocouples) and discuss thermal damage of different tissues (bone, periodontal fibers, and peripheral trigeminal nerves), furthermore including the clinical consequences (osteonecrosis, alveolitis, ankyloses, paresthesia).				

Declaration of the course:

Semester: autumn
Application deadline: 07. 09.
Application: **name:** Dr. Szalma József
telephone: 72/535-924 or 35924
email: szalma.jozsef@pte.hu

Maximum number of attending students:15
Criteria of acceptance in case of overbooking: declaration of acceptance from the leader of the course

Time frame of education total hours of the course: 14
number of lectures per week: 2x 45 minutes

Type of examination: oral
Type of remedial exam: oral

Criteria of accepting the course (exams, maximum number of absence, etc.): attendance of 80% of the classes
Opportunities for making up for non-attendance: -
List of resources (book, note, other) **required for learning the curriculum:** The educational material provided by the lecturers.

Topics and instructors of the activities (all lectures, practices, seminars separately):

1. Definition of the osteonecrosis. Clinical consequences of thermal damage of the alveolar bone. Heat tolerance of the periodontium and peripheral nerves and their reaction on thermal damage. (*Szalma József*)
2. The thermal parameters of rotating instruments and piezoelectric preparations used in dentistry, oral surgery and implantology, including literature review of relevant topics of orthopedic-traumatology, neurosurgery. (*Szalma József*)
3. Physical parameters of drills and burs determining intraosseal heat elevations. (*Szalma József*)
4. In vitro bone simulating materials. Comparisons of animal bone and synthetic bone models. (*Szalma József*)
5. The possibilities of registering thermal consequences of rotating and piezoelectric instruments. The accepted heat measurement methods in the literature. Methods of our clinical investigations and its representation. Benefits and limitations. (*Szalma József*)
6. Heat development of composite materials during photo-polymerization and the methods of heat measurements. Harmful temperatures of ultrasonic devices in the periodontium, alveolar bone by removal of endodontic files or intrapulpal posts. (*Lempel Edina* and *Krajczár Károly*)
7. The harmful intraosseal temperatures of orthodontic mini-implant insertions and heat during the predrilling process. Heat reducing strategies and its effect on the clinical success and survival rates. (*Gurdán Zsuzsanna*)

code	instructor in charge	title	credit	host department
OPEL_A-138/1993_SZL1	**Dr. Szereday, László** **Dr. Meggyes, Mátyás**	Principles and techniques of cell separation	4	Medical Microbiology and Immunology
description	No prior knowledge of flow cytometry is assumed. The course will include lectures and practical sessions on applications including Ficoll gradient cell separation, magnetic cell isolation and separation with Miltenyi MACS tecnique and fluorescent labelled cell separation with BD FACS ARIA cytometer (high purity sorting, single cell sorting, cell separation onto microscope slides).			

Declaration of the course:

Semester: both
Application deadline: 1 October / 1 February
Application: **name:** dr. Szereday, László
telephone: 536001/31907
email: szereday.laszlo@pte.hu

Maximum number of attending students: 4
Criteria of acceptance in case of overbooking: order of application

Time frame of education total hours of the course: 24
number of lectures per week: 8
number of practices per week: 16

Type of examination: oral
Type of remedial exam: oral

Criteria of accepting the course (exams, maximum number of absence, etc.).: oral exam
Opportunities for making up for non-attendance: No make up lectures and practices.

List of resources (book, note, other) **required for learning the curriculum:** Lecture slides and notes.

Topics and instructors of the activities (all lectures, practices, seminars separately):
Day 1.: Lectures: Principles and different techniques of cell separation (László Szereday and Mátyás Meggyes)

1. Mononuclear cell separation from blood
   1.1. Sample preparation
   1.2. Principle of cell separation
   1.3. Cell counting
2. Magnetic cell separation with Miltényi MACS Microbeads
   2.1. Principle of magnetic cell separation
   2.2. Positive and negative cell separation
3. Fluorescent labelled cell separation with BD FACS ARIA cytometer: high purity sorting, single cell sorting, cell separation onto microscope slides etc.
   3.1. Principle of flow cytometric cell separation
   3.2. Sample preparation
   3.3. Principle of cell separation

Day 2. Practice: Separation of PBMC by Ficoll gradient and magnetic cell isolation and separation with MACS Microbeads (László Szereday and Mátyás Meggyes)
Day 3. Practice: Flow cytometric cell separation (László Szereday and Mátyás Meggyes)

code	instructor in charge	title	credit	host department

OPGY_A-292/1994_SZE1	**Dr. Szőke, Eva, Dr. Tékus, Valéria**	**Modern drug research and development, experimental possibilities in drug development**	3	Department of Pharmacology and Pharmacotherapy
description	The topic will discuss the need for drug development and the history of drug development. We will compare traditional drug discovery and modern drug development. Students will learn about the drug target identification and validation, drug design, and lead molecule selection and testing. They will learn about in vitro, ex vivo and in vivo preclinical drug development, as well as numerous animal experimental methods, as well as the principles of writing ethical license applications. They will learn about clinical phase studies. During the lectures, it will also be possible to practice all the animal experimental methods found in our department.			

Declaration of the course:

Semester: both
Application deadline: 5th of February or 6th of September
Application: **name:** Dr. Szőke, Éva
telephone: 06 20 9951243
email: **eva.szoke@aok.pte.hu**

Maximum number of attending students: 6
Criteria of acceptance in case of overbooking: order of application

Time frame of education total hours of the course: 21
number of lectures per week: 3 (7 weeks)

Type of examination: written
Type of remedial exam: oral

Criteria of accepting the course (exams, maximum number of absence, etc.).: active participation in the practices, maximum 3 hours absent, successful exam
Opportunities for making up for non-attendance: -

List of resources (book, note, other) **required for learning the curriculum:**
Materials will be available to students in pdf format.

Topics and instructors of the activities (all lectures, practices, seminars separately):

1.	Basic definitions in pharmacology. What is the reason of the drug development?	Dr Éva Szőke
2.	History of drug development.	Dr Éva Szőke
3.	Traditional and modern drug development.	Dr Éva Szőke
4.	How can we perform drug target validation?	Dr Éva Szőke
5.	Drug design and synthesis.	Dr Éva Szőke
6.	HTS, lead molecule selection and testing.	Dr Éva Szőke
7.	Investigation of drug candidates, in vitro preclinical testing.	Dr Éva Szőke
8.	Investigation of drug candidates, ex vivo preclinical testing.	Dr Éva Szőke
9.	In vivo animal experiments in drug development.	Dr Éva Szőke
10.	Clinical phases studies.	Dr Éva Szőke
11.	Legal aspects in drug development.	Dr Éva Szőke
12.	Serendipity in drug development.	Dr Éva Szőke
13.	In vivo animal experiments in drug development: Acute pain models.	Dr Valéria Tékus

14.	In vivo animal experiments in drug development: Chronic pain models.	Dr Valéria Tékus
15.	In vivo animal experiments in drug development: Animal models of inflammation.	Dr Valéria Tékus
16.	In vivo animal experiments in drug development: Behavioral pharmacological studies I.	Dr Valéria Tékus
17.	In vivo animal experiments in drug development: Behavioral pharmacological studies II.	Dr Valéria Tékus
18.	Minimally invasive interventions without anaesthesia: oral and non-oral intake of medicines in practice.	Dr Valéria Tékus
19.	Calculation of the dose of anaesthetics for different species.	Dr Valéria Tékus
20.	Recognition and alleviation of pain during animal experiments.	Dr Valéria Tékus
21.	Pitfalls in preparation of ethical license applications.	Dr Valéria Tékus

code	instructor in charge	title	credit	host department
OPKL_B-4/2004_TUK1	**Dr. Turzó, Kinga**	Biomaterials and biocompatibility in medicine and dentistry	2	Department of Oral and Maxillofacial Surgery
description	As healthcare improves and people tend to live longer, materials with specific biomedical applications become more and more important. Biomaterials or alloplastic materials are synthetic materials used in devices replacing parts of living systems or to function in intimate contact with the living tissues for any period of time. In the last decades one of the most important research fields of biomedical sciences are the investigation of the biointegration of alloplastic materials and the development of biocompatible materials. The Ph.D. course aims to study these biomaterials and to understand those molecular processes which determine their successful bio- or osseointegration. The most frequently used medical implants are dental implants that serve to substitute human teeth. During our studies we have gained important information's that can be also applied in case of other implants (for e.g. orthopedic implants). Although the bulk properties (mechanical and thermal characteristics) of biomaterials are important with respect to their biointegration, the biological responses of the surrounding tissues to implants are controlled mostly by their surface characteristics (chemistry and structure) because biorecognition takes place at the interface of the implant and host tissue. Biological surface science methods (ESCA, SEM, AFM, etc.) are introduced in the course as well as biocompatibility tests, given by the ISO-10993 standard.			

Declaration of the course:

Semester: autumn
Application deadline: September 7
Application: **name:** Dr. Turzó, Kinga
telephone: 30-4789614
email: turzo.kinga@pte.hu

Maximum number of attending students: 10
Criteria of acceptance in case of overbooking: order of application

Time frame of education total hours of the course: 14
number of lectures per week: 1
number of seminars per week: 1

Type of examination: oral

Type of remedial exam: oral

Criteria of accepting the course (exams, maximum number of absence, etc.).: passing the oral exam, max. 2 lectures absence

Opportunities for making up for non-attendance: None

List of resources (book, note, other) **required for learning the curriculum:**

- Biomaterials Science: An Introduction to Materials in Medicine. Ed. B.D Ratner, A.S. Hoffman, F.J. Schoen, J.E. Lemons. Academic Press, 1996.
- Park, J.B. (2000). Biomaterials, In: The Biomedical Engineering Handbook, 2nd ed., Vol. I, Bronzino, J.D., (Ed.), IV-1-IV-5, CRC Press and IEEE Press, ISBN 0-8493-0461-X, Boca Raton, Florida, USA
- O'Brien, W.J. Dental Materials and Their Selection, 3. ed. Quintessence, ISBN 0-86715-406-3, 2002
- K.J. Anusavice: Phillips' Science of Dental Materials (10th ed), B. Saunders Company, ISBN 0-7216-5741-9, Philadelphia, Pennsylvania, USA, 1996
- Lectures

Topics and instructors of the activities (all lectures, practices, seminars separately):

1. Introduction to biomaterials science. Historical overview. Classes of biomaterials used in dentistry and medicine.
2. Bulk properties of materials 1st part: mechanical and thermal properties of biomaterials.
3. Bulk properties of materials 2nd part: electrical and optical properties of biomaterials.
4. Surface characteristics of biomaterials
5. Investigation methods of the surfaces of biomaterials (contact angle, ESCA, SEM, STM, AFM, SIMS, IRS)
6. Interaction between the host and biomaterial: host reactions to biomaterials and response of biomaterials to implantation and degradation of biomaterials in the biological environment.
7. Biomaterials made of metals (stainless steels, Co-Cr alloys, Ti alloys and metals used in dentistry)
8. Biointegration and osseointegration of titanium implants.
9. Physical-chemical and biochemical surface modifications of dental implants. Thin films, coatings and fabrics.
10. Biomaterials made of polymers, types of polymers, polymerization, mechanical and thermal properties.
11. Ceramics and bioceramics (bioinert, calcium-phosphate ceramics, bioactive glasses)
12. Composites as biomaterials. Natural materials (proteins, polysaccharides, polynucleotide's). Hydrogels, bioresorbable and bioerodible materials.
13. Biocompatibility tests (ISO-10993 Standard).
14. Testing biomaterials (*in vitro*, *in vivo* assessment, animal models and biomechanical tests).

code	instructor in charge	title	credit	host department
OPKL_B-149/1993_VAT1	**Dr. Varjas, Tímea**	Chemoprevention of Cancerous Diseases	2	Public Health Medicine
description	During the course, we will systematically examine, in light of the latest scientific literature, plant-derived and synthetic compounds and active agents that may contribute to the prevention of carcinogenesis and the reduction of tumor development risk. By analyzing mechanisms of action through cell line studies, animal models, and human clinical research, we will gain deeper insights into strategies for cancer prevention and inhibition of metastasis formation. Furthermore, we will investigate the pathways of human bioavailability and assess the potential for integrating specific plant-derived compounds into dietary interventions.			

Declaration of the course:

Semester: spring
Application deadline: **20. February**
Application: name: **Timea Varjas**
email: **timea.varjas@aok.pte.hu**

Maximum number of attending students: **16**

Criteria of acceptance in case of overbooking: **order of application**

Time frame of education total hours of the course: **14**
number of seminars per week: **14**

Type of examination: written

Type of remedial exam: written

Criteria of accepting the course (exams, maximum number of absence, etc.).: maximum absence: 25% submission of essay and writing of final course test

Opportunities for making up for non-attendance: individual assessment

List of resources (book, note, other) **required for learning the curriculum:**
latest research results from PubMed

Topics and instructors of the activities (all lectures, practices, seminars separately):

1	Definition of chemoprevention, grouping of active ingredients	Varjas Tímea
2	Intervention points in the multistep carcinogenesis process	Varjas Tímea
3	Role of phase I and phase II enzymes in carcinogenesis and chemoprevention	Varjas Tímea
4	DNA repair mechanism	Afshin Zand
5	Regulation of oncogene activity	Afshin Zand
6	Modification of suppressor gene expression	Afshin Zand
7	Role of DNA methyltransferases, histone deacetylases in chemoprevention	Afshin Zand
8	Telomerase activity, effect of telomere length on the process of tumorigenesis	Afshin Zand
9	Role of microRNAs, Lnc RNAs	Afshin Zand
10	Possibilities for the prevention of hormone-dependent tumors	Afshin Zand
11	Molecular background of apoptosis regulation, intervention options	Varjas Tímea
12	Arachidonic acid metabolism and chemoprevention	Varjas Tímea
13	Processes regulating cell differentiation	Varjas Tímea
14	Inhibition of angiogenesis and cell proliferation as a chemoprevention target	Varjas Tímea

code	instructor in charge	title	credit	host department
OPEL_B-372/1996_VAC1	**Dr. Varjú, Cecília**	Methods for assessing and monitoring organ involvement in rheumatology	1	Department of Rheumatology and Immunology

		patients		
description	The course covers the clinical characteristics of rheumatic diseases. The course also includes physical examinations and questionnaires for patients, which often provide essential parameters for clinical studies. The methods and results of our previous clinical follow-up studies will also be presented during the course.			

Declaration of the course:

Semester: **fall** spring both

Application deadline: 10th October, 2025

Maximum number of attending students: 20
Criteria of acceptance in case of overbooking: order of application

Time frame of education total hours of the course: 7 hours
number of lectures per week: 2
number of practices per week: 3

Type of examination: written
Type of remedial exam: written

Criteria of accepting the course (exams, maximum number of absence, etc.).: Maximum absence: 2 lessons
Opportunities for making up for non-attendance: There will be an opportunity to make up for missed classes by arrangement.

List of resources (book, note, other) **required for learning the curriculum:**
Kelley & Firestein's Textbook of Rheumatology

Topics and instructors of the activities (all lectures, practices, seminars separately):
Lecturer and practical instructor: Prof. Dr. Cecília Varjú
1. The importance of physical examination in rheumatology. The possibilities and significance of assessing and monitoring damage, function, and quality of life in clinical practice. **Lecture**
2. Examination of patients with rheumatoid arthritis and their hand function **Practical lesson**
3. Examination and follow-up the organ manifestation in patients with systemic sclerosis **Lecture**
4. Clinical characteristics of patients with systemic lupus erythematosus and methods for examining disease activity and damage **Lecture**
5. Examination and monitoring of organ involvement in patients with systhemic vasculitis **Lecture**
6. Internal and musculoskeletal manifestations of patients with ankylosing spondylitis **Practical lesson**
7. Clinical characteristics of osteoarthritis and methods for assessing their musculoskeletal status **Practical lesson**

code	instructor in charge	title	credit	host department
OPKL_A-327/1995_VAZ1	**Dr. Vámos, Zoltán**	From streets to the ICU	3	Department of Anaesthesiology and Intensive Therapy
description	The aim of the course to provide a structured overview of critical care and intensive therapy, following the clinical route from the prehospital care to the intensive care unit. The sessions combine theoretical knowledge with practical case discussions in the key topics of conditions that require intensive care (periarrest periods, advanced life supports, polytrauma, advanced airway management, mechanical ventilation, severe brain injury, major bleeding, team dynamics and communication). The course emphasizes guideline-based practices, preparing students for real-world emergency scenarios and focus on the time-sensitive critical care situations.			

Declaration of the course:

Semester: spring
Application deadline: February 01. (02.01.)
Application: **name:** Ábel Papp M.D.
telephone: +36 30 553 9282
email: pappabel0219@gmail.com

Maximum number of attending students: 15
Criteria of acceptance in case of overbooking: Declaration of acceptance from the leader of the course

Time frame of education total hours of the course: 20 (10 weeks; 2 x 60 min / week)
number of lectures per week: 2

Type of examination: oral exam
Type of remedial exam: oral exam

Criteria of accepting the course (exams, maximum number of absences, etc.): attendance of 80% of the classes and pass of the oral examination

Opportunities making up for non-attendance: Discussed with the course's instructor in charge

List of resources (book, note, other) **required for learning the curriculum:** The lectures will be provide all educational material

Topics and instructors of the activities (all lectures, practices, seminars separately):
1. **Basics of prehospital and hospital emergency and intensive critical care:** scene management, ABCDE approach, primary and secondary survey, multimodal monitoring, air/ground transport, team dynamics and differences – Zoltán Vámos, Abel Papp
2. **Airway, Breathing, Circulation emergencies**: supraglottic devices, endotracheal intubation, surgical airway management, oxygen therapy and (non)-invasive ventilation, blood pressure controll – Zoltán Vámos, Abel Papp
3. **Basic and Advanced Life Support:** Basic Life Support, Advanced Life Support, post-resuscitation care – Zoltán Vámos, Abel Papp
4. **Advanced Cardiac Life Support:** acute coronary syndrome, tachy- and bradyarrythymias, aortic dissection, pulmonary embolism – Zoltán Vámos, Abel Papp
5. **Simulation practice I.:** airway management, intravenous/intraosseous access, chest tube, cardiopulmonary-resuscitation in special circumstances and arrhythmia scenarios, emphasis on team roles and communication – Zoltán Vámos, Abel Papp
6. **Advanced Trauma Life Support I.:** traumatic brain and spine injuries – Zoltán Vámos, Abel Papp
7. **Advanced Trauma Life Support II.:** polytrauma, traumatic resuscitation, massive transfusion protocol, thoracostomy and thoracotomy – Zoltán Vámos, Abel Papp
8. **Advanced Neurological Life Support:** acute ischemic stroke, intracranial haemorrhages, status epilepticus, central nervous system infections – Zoltán Vámos, Abel Papp
9. **Advanced Sepsis/Hazmat Life Support:** early recognition of sepsis, multimodal vasopressor therapy, toxidromes and antidote strategies – Zoltán Vámos, Abel Papp
10. **Simulation practice II.:** complex multisystem emergency scenarios – Zoltán Vámos, Abel Papp

code	instructor in charge	title	credit	host department
OPEL_A-137/1993_ZED1	**Dr. Zelena, Dóra**	Preclinical examination of psychiatric diseases	3	Department of Physiology

description	Nowadays, psychiatric illnesses are becoming more common, partly due to increasing stress (eg anxiety, depression) and partly due to an aging society (eg dementia).

	Unfortunately, their therapy is not solved. A better understanding of the underlying mechanisms can bring us closer to discovering new drug targets. To do this, as well as testing new drugs, appropriate animal models and tests are required. Students will be able to get acquainted with the classification of psychiatric diseases, their main symptoms, and get a comprehensive picture of possible preclinical models and available as well as new methods under development. Special focus will be given to new research areas such as viral vectors, opto- and pharmacogenetics, epigenetics and "big data" and we will present their potential role in diagnosis and therapy.

Declaration of the course:

Semester: autumn
Application deadline: August 31
Application: **name:** dr. Zelena, Dóra
telephone: +36-20-9251954
email: dora.zelena@aok.pte.hu

Maximum number of attending students: 60
Criteria of acceptance in case of overbooking: order of application

Time frame of education total hours of the course: 24
lectures only, 1-12 weeks of the semester, 2 hours per week

Type of examination: written
Type of remedial exam: written

Criteria of accepting the course (exams, maximum number of absence, etc.).: passing the oral exam, maximum absence 3 hours, passing a written test
Opportunities for making up for non-attendance: None

List of resources (book, note, other) **required for learning the curriculum:**
ppt from the lectures
Topics and instructors of the activities (all lectures, practices, seminars separately):
1-2 Introduction: Categorization of psychiatric diseases, validity of animal models
3-4 The role of motion in preclinical studies, the Parkinson and Huntington's disease, viral vectors in therapy
5-6 Circadian rhythm, speel-wakefulness, EEG, major regulators and role in the development and research of psychiatric diseases
7-8 Anxiety and posttraumetic stress disorder
9-10 Mania and depression: Can it be positive?
11-12 Learning and memory, from elementary processes till complex tests
13-14 Dementia, Alzheimer's Disease, an important problem of our aging society, "big data" data collection (proteomica, lipidomica, etc.) and possibilities their usefullness in psychiatry
15-16 Social behavior, friendship and aggression in animals and sick people from mechanisms to therapeutic options. Opto- and pharmacogenetic methods in research.
17-18 Drugs and addiction. Everyone is addicted?
19-20 Schizophrenia and autism
21-22 The relationship of psychiatric diseases with metabolism, the brain-gut axis and the vagus in the development and therapy of diseases
23-24 Examination

The accredited Doctoral Schools of the University of Pécs under the competence of the the Doctoral Council and Habilitation Committee of Medical and Pharmaceutical Sciences, their programmes and leaders

		leader of the Doctoral School / Program leader
Basic Medical Sciences D95	**Dr Reglődi, Dóra**	
A-138/1993	Immunological aspects of reproduction	Dr Mikó, Éva
B-139/1993	Essentials of immunology	Dr Berki, Tímea
B-372/1996	Immunological and clinical aspects of polisystemic autoimmune conditions	Dr Varjú, Cecília
A-137/1993	Theoretical and practical guidance for the multidisciplinary research of the central neural and humoral regulation	Dr Zelena, Dóra
B-134/1993	Neuroendocrinology and neurohistology	Dr Reglődi, Dóra
B-377/1997	Behavioural sciences	Dr Csathó, Árpád
A-141/1993	Molecular pathogenesis of bacterial infections	Dr Kerényi, Mónika
Clinical Medical Sciences D94	**Dr Vereczkei, András**	
A-319/1995	Nephrology - Diabetology	Dr Wittmann, István
A-442/2000	Reproductive endocrinology	Dr Kovács, Kálmán
A-146/1993	Significance of molecular pathological and laboratory studies in medical diagnostics and therapy	Dr Miseta, Attila
B-145/1993	Molecular pathomorphology	Dr Kajtár, Béla
A-327/1995	Investigation of circulatory pathological conditions in experimental models and clinical patient material	Dr Jancsó, Gábor
B-322/1996	Cardiovascular and occupational health-operational medicine	Dr Tóth, Kálmán
B-149/1993	Molecular epidemiology of tumours	Dr Kiss, István
B-414/1998	Nutrition studies in childhood	Dr Erhardt, Éva
B–2/2004	The clinical and molecular research of the new mechanisms, diagnostics and therapy of cardiovascular diseases	Dr Szokodi, István
B–4/2004	Basic and applied research in dental and oral diseases	Dr Nagy, Ákos Károly
B-1/2006	Clinical aspects and pathobiochemistry of metabolic and endocrine diseases	Dr Mezősi, Emese
B-1/2008	Surgery and its border fields	Dr Vereczkei, András
B-1/2010	Clinical studies on locomotion	Dr Than, Péter
B-2/2013	Functional injuries of parenchymal organs and the consequences: clinical and interdisciplinary approaches	Dr Szántó, Zalán

Clinical Neurosciences D221 **Dr Janszky, József**

B-1/2005	Clinical neuroimmunology and stroke	Dr Szapáry, László
B-2/2014	Neuromorphology and neuropathology	Dr Ábrahám, Hajnalka
B-3/2014	Imaging in neuroscience	Dr Bogner, Péter
B-4/2014	Neurosurgery	Dr Schwarcz, Attila
B-5/2014	Clinical and human neurosciences	Dr Janszky, József
B-6/2014	Neurology	Dr Pfund, Zoltán
B-1/2012	Psychiatry	Dr Tényi, Tamás
B-1/2025	Neurointensive care	Dr. Molnár, Tihamér

Interdisciplinary Medical Sciences D93 **Dr Gallyas, Ferenc**

A-129/1993	Molecular and cellular biochemistry	Dr Gallyas, Ferenc
B-130/1993	Investigating functional protein dynamics using biophysical methods	Dr Nyitrai, Miklós
B-131/1993	Intracellular signal transduction pathways	Dr Sétáló, György
B-299/1995	Haematology	Dr Alizadeh, Hussain
B-449/1999	Human Molecular Genetics	Dr Gallyas, Ferenc
B-2/2008	Evidence based medicine	Dr Decsi, Tamás
B–1/2013	Analytic techniques in biochemistry and molecular biology	Dr Gallyas, Ferenc

Pharmacology and Pharmaceutical Sciences D92 **Dr Pintér, Erika**

A- 148/1993	The isolation and examination of biologically active compounds	Dr Deli, József
A-143/1993	Optimization of pharmacotherapy	Dr Botz, Lajos
B-1/2014	Pharmaceutical chemistry	Dr Perjési, Pál
A-144/1994	Toxicology	Dr Pethő, Gábor
B–1/2004	The role of neuroimmune interactions in pain and inflammation	Dr Helyes, Zsuzsanna
A-292/1994	Neuropharmacology	Dr Pintér, Erika
B-1/2016	Translational Medicine	Dr Hegyi, Péter