Filters used for the printout

Curriculum period: 2023-24. Studies included in the printout: Study modules and courses. Languages of the descriptions: All. Language of the printout template: English.

T921107 Doctoral Programme Brain & Mind

T921107 Aivot ja mieli tohtoriohjelma

T921107 Doktorandprogrammet hjärna och medvetande

2023-24

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	40 cr
Languages	English, Finnish, Swedish
Grading scale	Pass-Fail
Content approval required	no
Locations	Helsinki
University	University of Helsinki
Responsible organisation	Faculty of Biological and Environmental Sciences 100%
Responsible persons	Katri Wegelius, Administrative person Tomi Rantamäki, Responsible teacher
Degree programme type	Doctor's Degree
Degree titles	Doctor of Odontology Doctor of Medical Science Doctor of Philosophy (Pharmacy) Doctor of Philosophy (Psychology) Doctor of Philosophy Doctor of Veterinary Medicine
Study field	Field of Education 2002, Natural Sciences Fields of education (Ministry of Education and Culture), Medical science
Education classification	839103 PhD, Psychology 815201 PhD, Educational Science 875101 Doctor of Medical Science 845701 PhD, Biology 845702 PhD, Biosciences, Biochemistry 836501 PhD (Psychology) 875603 PhD, Veterinary Science 875604 PhD, Pharmacy 875601 PhD, Medicine 875401 Doctor of Science (Pharmacy)

Content description

EN: B&M is based on a multidisciplinary network of neuroscience research groups at the University of Helsinki and Aalto University. The doctoral candidates have a background in medicine, biosciences, psychology, cognitive science, humanities, pharmacology, medical technology, physics or chemistry.
Research and doctoral training in the B&M includes the following fields of science:

- Developmental neuroscience
- Excitability, synaptic transmission, and neuronal networks
- Disorders of the nervous system

- Sensory and motor systems
- Neuroimmunology, neuroendocrine systems and sleep
- Cognitive and behavioral neuroscience
- Systems and computational neuroscience

In addition to basic research, a number of the research groups are also developing applications relevant for pharmaceutical companies, for the clinic, and for novel technologies to be used in research.

The B&M doctoral candidates will carry out research in a research group and write a doctoral thesis based on this work. The University of Helsinki hosts many internationally prominent #neuroscience research groups#and the Doctoral Programme Brain & Mind links researchers and lecturers especially within the biosciences, biomedicine and psychology.# This active neuroscience community offers unique opportunities for research and doctoral studies in state-of-the-art facilities and an inspiring research-oriented atmosphere.# Doctoral candidates will also attend theoretical and methods courses that support their research. In addition to discipline-specific courses, doctoral students will participate in courses on transferable skills for future career in academia, government or private sector.

STRUCTURE

In addition to the doctoral thesis, 40 ECTS of course work is required for the degree. It is possible to finish doctoral degree in 4 years of full time work. #The doctoral candidates have an opportunity to select theoretical and practical courses, seminars and book exams from different fields of neuroscience to support their thesis work. In addition, University of Helsinki Doctoral School provides transferable skills training essential for successful careers within academia as well as in the private and public sectors.

Doctoral degree includes the following:

- Substance-specific training (30 ECTS), including obligatory studies in research ethics, passing a B&M book exam and participation in the B&M Symposium.
- Transferable skills training (10 ECTS), such as communication, teaching, management and entrepreneurship skills
- International mobility, e.g. research collaboration
- Doctoral dissertation

Doctoral dissertation can be either A) an article-based dissertation #that includes a summary section and a compilation of peer-reviewed scientific articles (or manuscripts intended for publication) on the same scientific question; or B) a monograph#which is a scientific work issued under the name of the doctoral candidate alone and based on previously unpublished results of independent research.

The objective of doctoral education is the student to be well-versed in his/her own field of research and to possess the knowledge and skills needed to independently apply scientific research methods and produce new scientific knowledge.

INTERNATIONAL SKILLS

The Doctoral Programme Brain & Mind is a truly international doctoral programme with 30-40% of the doctoral candidates originating from outside Finland, represented by over 15 nationalities. The pool of teaching staff is also highly international with many global cooperation partners. Regular events are held where doctoral candidates can network with top-level international scientists who are visiting Finland. These include research seminars and student-organized scientific meetings. International mobility and networking is also encouraged and supported by travel grants to research/study visits, and for participation in courses, conferences and meetings abroad where the doctoral candidates can discuss their research with experts in their field.

B&M is part of the Network of European Schools in Neuroscience NENS, which provides further opportunities for networking in doctoral training events of other partner universities. In addition, DSHealth is part of the #Nordic Network of Doctoral Training#(NorDoc).

Learning outcomes

EN: Doctoral Programme#Brain & Mind (B&M)#trains doctoral graduates in neuroscience to provide them with:

- knowledge and understanding of the key theories and methods used in neuroscience in general,
- deeper theoretical and methodological expertise in the student's own scientific field and ability to apply this knowledge,
- skills for critical thinking of scientific methods, results and conclusions,
- good communication, argumentation and problem-solving skills, and other skills to work in demanding, multidisciplinary, international research and/or expert positions.

Additional information

EN: Career opportunities
The Doctoral Programme Brain & Mind provides in-depth training and education required for careers in academic research, pharmaceutical, biomedical or biotechnical industry, and expert appointments locally and abroad.

A doctoral degree opens the door to many interesting career possibilities. In addition to a purely academic career as a post-doctoral researcher, opportunities exist in the public and private sector in Finland and abroad. For instance: scientific expert positions in ministries, research and government agencies, research institutes, foundations, patent offices; administrative jobs in higher education establishments; jobs in scientific publishing and journalism, private companies, start-ups etc.

DEGREE STRUCTURE

Part of the degree	Credits
DOCTORAL PROGRAMME BRAIN & MIND	40 cr
NEUBM-999 Doctoral Thesis	0 cr
DISCIPLINE-SPECIFIC STUDIES (grouping module)	
NEUBM-998 DISCIPLINE-SPECIFIC STUDIES	30 cr
OBLIGATORY STUDIES (grouping module)	
PHD-401 Research Ethics	1-2 cr
NEUBM-010 Book exam 1	5 cr
NEUBM-101 B&M Symposium poster	1-2 cr
ELECTIVE DISCIPLINE-SPECIFIC STUDIES (grouping module)	
NEUBM-011 Book exam 2	1-5 cr
NEUBM-205 Advances in neuroimmunology and neuroinflammation	3 cr
NEUBM-211 Microglia and recent technologies	3 cr
NEUBM-301 Biological psychiatry 1	1-2 cr
NEUBM-302 Biological psychiatry 2	1-2 cr
NEUBM-303 NeuPhar 1	2-5 cr
NEUBM-304 NeuPhar 2	2-5 cr
NEUBM-309 Computational neuroscience	1-3 cr
NEUBM-507 B&M "What's up" Journal Club	1-2 cr
NEUBM-533 Functional neuroanatomy	3 cr
NEUBM-610 Big questions in neuroscience and current limits of knowledge	1-2 cr
NEUBM-611 Milestones in the history of neuroscience DRAFT	5 cr
NEUBM-771 Other elective studies	1-10 cr
NEU-104 Integrative neurobiology	5 cr
NEU-502 Synaptic Signaling and Plasticity	5 cr
NEU-512 Animal models in behavioural neuroscience	5 cr
NEU-521 Basic mechanisms of nervous system diseases	1-5 cr

- **NEU-531** Developmental neuroscience 5 cr
- **NEU-541** Introduction to neurobiophysics 5 cr
- **NEU-542** Electrophysiological techniques 5 cr
- **NEU-543** Brain slice electrophysiology 5 cr
- **NEU-511** Systems and Cognitive Neuroscience 5 cr
- **NEU-561** Principles of bioscience omics 10 cr
- **NEU-603** Laboratory animal science 1-5 cr
- **NEU-231** Mechanisms of regeneration and aging 5 cr
- **TMED-406** Translational Psychiatry 5 cr
- **MED-TOU11** An Introduction to Sleep and Circadian Neurobiology 2.5 cr
- **MED-TOU25** Interdisciplinary insights into sleep and circadian rhythms 2.5 cr
  DRAFT
- **DATA20047** Probabilistic Cognitive Modelling 5 cr
- **DPBM-148** In Vivo Animal Imaging: Methods and Applications 1-2 cr
- **HUB-011** Book exam 1: Cognitive neuroscience 5-10 cr
- **HUB-111** Clinical and cognitive human brain research 5 cr
- **HUB-114** Functioning of sensory systems: Visual neuroscience 5 cr
- **HUB-121** MEG/EEG source modelling: from principles to practice 2 cr

SCIENTIFIC SEMINARS AND ACTIVITIES (grouping module)

- **NEUBM-102** B&M Symposium 2 1-2 cr
- **NEUBM-103** B&M Symposium 3 1-2 cr
- **NEUBM-104** B&M Symposium 4 1-2 cr
- **NEUBM-105** Scientific seminars, conferences, symposia 2-6 cr
- **NEUBM-106** Research visit 2-3 cr
- **NEUBM-107** Scientific publications not included in the thesis 1-4 cr
- **NEUBM-702** Public outreach in neuroscience 1-4 cr
- **NEUBM-703** B&M Student Council / Board Member 2-4 cr

TRANSFERABLE SKILLS (grouping module)

PHD-997 GENERAL COMPETENCE STUDIES 10 cr

SCIENTIFIC THINKING (- WHAT IS SCIENCE?) (grouping module)

- **PHD-103** Philosophy of science 1-5 cr
- **PHD-104** HCAS Winter/Summer School 3 cr
- **PHD-151** Optional studies in scientific thinking 1 1-10 cr
- **PHD-152** Optional studies in scientific thinking 2 1-10 cr
- **PHD-153** Optional studies in scientific thinking 3 1-10 cr
- **PHD-102** Academic rhetoric and argumentation 1-5 cr

SCIENTIFIC COMMUNICATION AND SOCIETAL IMPACT (grouping module)

- **PHD-201** Academic Pitching 1-5 cr
- **PHD-202** Academic Writing and Editing 2 cr
- **PHD-203** Conference presentation 2 cr
- **HEALTH-124** Facing the Final Frontier: Preparing the Doctoral Dissertation Book for Health Scientists 1 cr
- **PHD-205** Grant Writing I 1 cr
- **PHD-206** Grant Writing II 2 cr
- **PHD-207** Kirjoittamiskäytännöt: Luovuutta ja ideoita väitöskirjan kirjoitusprosessiin 1 cr
- **PHD-208** Luova tieteellinen kirjoittaminen 1-5 cr

PHD-251 Optional studies in scientific communication and societal impact 1	1-10 cr
PHD-252 Optional studies in scientific communication and societal impact 2	1-10 cr
PHD-253 Optional studies in scientific communication and societal impact 3	1-10 cr
PHD-218 Popularisation of science	1-2 cr
PHD-204 Poster presentation and data visualisation	1-2 cr
PHD-209 Principles of Peer Review	1 cr
PHD-211 Principles of Scientific Writing for Health Scientists 2 - from proposal to paper	2 cr
PHD-210 Principles of Scientific Writing for Health Scientists	2 cr
PHD-212 Science in Society	5 cr
PHD-217 Storytelling for Health Scientists	3 cr
TIVI-Y911 Tiedeviestintä: Asiantuntijana digitaalisessa mediassa	5 cr
TIVI-Y912 Scientific journalism	5 cr
TIVI-Y913 Tiedeviestintä Tieteen popularisointi	5 cr
PHD-213 Tutkijan verkkokirjoittaminen	3 cr
PHD-214 Väittelijän vuorovaikutusosaaminen	2 cr
PHD-215 Writing Doctoral Research for Health Scientists	3 cr
PHD-216 Writing Journal Article in Twelve Weeks	5 cr
PVM-604 Communicating Science and Expertise	5 cr
PVM-V308 Science Communication	5 cr
SUKU-S330 Concept analysis and terminology work	5 cr
WORKING LIFE SKILLS (grouping module)	
HEALTH-114 Biomedical view to patenting	2 cr
PED511 UP1 Learning in Higher Education	5 cr
PED5121 UP 2.1 Constructive Alignment in Course Design	5 cr
PED5122 UP 2.2 Assessment of Learning and Giving Feedback	5 cr
PHD-101 PhD Career course	2 cr
PHD-303 Project management and leadership	2 cr
PHD-305 Biobusiness course	3 cr
PHD-306 Conference Organising	1-5 cr
PHD-307 Doctoral programme/school or university activities	1-2 cr
PHD-308 Mielekäs akateeminen työ	3 cr
PHD-309 Research funding	1-2 cr
PHD-310 Language studies supporting working life skills	1-5 cr
PHD-311 Ajanhallinnan haasteet muun työn ohessa väitöskirjaa tekeville	2 cr
PHD-351 Optional studies in professional development 1	1-10 cr
PHD-352 Optional studies in professional development 2	1-10 cr
PHD-353 Optional studies in professional development 3	1-10 cr
PHD-404 Industrial property rights	2 cr
PHD-503 Leading a creative expert organisation	1-5 cr
HEALTH-111 Optional courses: Management and Entrepreneurship	1-5 cr
RESPONSIBLE RESEARCH (grouping module)	
LIB-900 Information Management for Doctoral Researchers	1 cr
NEU-603 Laboratory animal science	1-5 cr
PHD-301 Open Science	1 cr
PHD-302 Introduction to Open Data Science	5 cr
PHD-405 Doctoral Education Base Camp	3 cr

- **PHD-406** Responsible Research and Innovation (RRI) 1 cr
- **PHD-451** Optional studies in responsible research 1 1-10 cr
- **PHD-452** Optional studies in responsible research 2 1-10 cr
- **PHD-453** Optional studies in responsible research 3 1-10 cr
- **SUST-001** Sustainability course 3 cr
- **TKT21018** Elements of AI: Introduction to AI 2 cr

OTHER GENERAL COMPETENCE STUDIES (grouping module)

FILTERED STUDY MODULES

NEUBM-998 Discipline-specific studies

NEUBM-998 Tieteenalaopinnot

NEUBM-998 Studier inom vetenskapsområdet

Abbreviation: Discipline-speci

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	30 cr
Languages	English, Finnish
Graded module	yes
Grading scale	Pass-Fail
Content approval required	yes
University	University of Helsinki
Responsible organisation	Doctoral Programme Brain and Mind 100%
Responsible persons	Tomi Rantamäki, Responsible teacher Katri Wegelius, Administrative person
Study module level	Other studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Study module structure	Credits
NEUBM-998 DISCIPLINE-SPECIFIC STUDIES	30 cr
OBLIGATORY STUDIES (grouping module)	
PHD-401 Research Ethics	1-2 cr
NEUBM-010 Book exam 1	5 cr
NEUBM-101 B&M Symposium poster	1-2 cr
ELECTIVE DISCIPLINE-SPECIFIC STUDIES (grouping module)	
NEUBM-011 Book exam 2	1-5 cr
NEUBM-205 Advances in neuroimmunology and neuroinflammation	3 cr
NEUBM-211 Microglia and recent technologies	3 cr
NEUBM-301 Biological psychiatry 1	1-2 cr
NEUBM-302 Biological psychiatry 2	1-2 cr
NEUBM-303 NeuPhar 1	2-5 cr
NEUBM-304 NeuPhar 2	2-5 cr
NEUBM-309 Computational neuroscience	1-3 cr
NEUBM-507 B&M "What's up" Journal Club	1-2 cr
NEUBM-533 Functional neuroanatomy	3 cr

NEUBM-610 Big questions in neuroscience and current limits of knowledge	1-2 cr
NEUBM-611 Milestones in the history of neuroscience DRAFT	5 cr
NEUBM-771 Other elective studies	1-10 cr
NEU-104 Integrative neurobiology	5 cr
NEU-502 Synaptic Signaling and Plasticity	5 cr
NEU-512 Animal models in behavioural neuroscience	5 cr
NEU-521 Basic mechanisms of nervous system diseases	1-5 cr
NEU-531 Developmental neuroscience	5 cr
NEU-541 Introduction to neurobiophysics	5 cr
NEU-542 Electrophysiological techniques	5 cr
NEU-543 Brain slice electrophysiology	5 cr
NEU-511 Systems and Cognitive Neuroscience	5 cr
NEU-561 Principles of bioscience omics	10 cr
NEU-603 Laboratory animal science	1-5 cr
NEU-231 Mechanisms of regeneration and aging	5 cr
TMED-406 Translational Psychiatry	5 cr
MED-TOU11 An Introduction to Sleep and Circadian Neurobiology	2.5 cr
MED-TOU25 Interdisciplinary insights into sleep and circadian rhythms DRAFT	2.5 cr
DATA20047 Probabilistic Cognitive Modelling	5 cr
DPBM-148 In Vivo Animal Imaging: Methods and Applications	1-2 cr
HUB-011 Book exam 1: Cognitive neuroscience	5-10 cr
HUB-111 Clinical and cognitive human brain research	5 cr
HUB-114 Functioning of sensory systems: Visual neuroscience	5 cr
HUB-121 MEG/EEG source modelling: from principles to practice	2 cr
SCIENTIFIC SEMINARS AND ACTIVITIES (grouping module)	
NEUBM-102 B&M Symposium 2	1-2 cr
NEUBM-103 B&M Symposium 3	1-2 cr
NEUBM-104 B&M Symposium 4	1-2 cr
NEUBM-105 Scientific seminars, conferences, symposia	2-6 cr
NEUBM-106 Research visit	2-3 cr
NEUBM-107 Scientific publications not included in the thesis	1-4 cr
NEUBM-702 Public outreach in neuroscience	1-4 cr
NEUBM-703 B&M Student Council / Board Member	2-4 cr

PHD-997 General competence studies

PHD-997 Yleiset valmiustaidot

PHD-997 Överförbara färdigheter

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	10 cr
Languages	English, Finnish, Swedish
Graded module	yes
Grading scale	Pass-Fail
Content approval required	no

University	University of Helsinki
Responsible organisation	University of Helsinki Doctoral School 100%
Responsible person	⚠ [information missing], Responsible teacher
Study module level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Education Fields of education (Ministry of Education and Culture), Business, administration and law Fields of education (Ministry of Education and Culture), Natural sciences Fields of education (Ministry of Education and Culture), Humanities Fields of education (Ministry of Education and Culture), Social sciences Fields of education (Ministry of Education and Culture), Agriculture and forestry Fields of education (Ministry of Education and Culture), Information and Communication Technologies (ICTs) Fields of education (Ministry of Education and Culture), Medical science

Learning outcomes

FI: Opintokokonaisuuden suoritettuaan tohtorikoulutettava:

- tunnistaa oman asiantuntijuutensa ja ymmärtää, miten se on sovellettavissa ja hyödynnettävissä työelämässä yliopistossa ja sen ulkopuolella
- omaa laajoissa ja vaativissa asiantuntija- ja kehitystehtävissä sekä kansainvälisessä yhteistyössä vaadittavan viestintä- ja kielitaidon
- omaa edellä mainittujen ja omien tulevaisuuden tavoitteidensa mukaisten tehtävien edellyttämiä muita taitoja kuten projektinhallintataidot, pedagogiset taidot, asioiden ja ihmisten johtaminen, neuvottelutaidot, hallinnolliset taidot, oman yrityksen perustamisen edellyttämät tiedot ja taidot.

SV: Efter att ha avlagt studiehelheten ska doktoranden:

- kunna identifiera sin egen expertis och förstå hur den kan tillämpas och utnyttjas i arbetslivet inom och utanför universitetet
- ha de kommunikations- och språkkunskaper som krävs för omfattande och krävande expert- och utvecklingsuppgifter och för internationellt samarbete
- ha övriga färdigheter som krävs för ovanstående uppgifter och för att kunna förverkliga sina framtida mål, t.ex. färdigheter i projektledning, pedagogiska färdigheter, ledarskapsfärdigheter, förhandlingsfärdigheter, administrativa färdigheter, kunskaper och färdigheter som krävs för att starta ett eget företag.

EN: After completing the module the student:

- Identifies his/hers expertise and understand how it is applicable and exploitable in working life at and outside the university
- Has skills needed in extensive and demanding expertise and development tasks, as well as international communication and language skills
- has the other skills required by the aforementioned tasks in accordance with their own future objectives, such as project management skills, pedagogical skills, management of things and people, negotiation skills, administrative skills, knowledge and skills required to set up a company.

Additional information

FI: Kohderyhmä
Pakollinen opintokokonaisuus.

Ajoitus

Suoritetaan yhtäaikaisesti väitöskirjatyön kanssa. Yleisten valmiustaitojen opintokokonaisuus tulee olla suoritettuna ennen väitöskirjan esitarkastukseen jättämistä.

Opintokokonaisuudesta järjestetään opintoja lukukausittain, ks. tarkemmat tiedot opintojaksojen kohdalta.

Arviointimenetelmät ja -kriteerit

Suoritettu opintokokonaisuus arvostellaan arvosanalla ”hyväksytty”.

SV: Målgrupp
Obligatorisk studiehelhet

Timing

Avläggs parallellt med doktorsavhandlingen. Helheten måste vara avlagd och registrerad innan avhandlingen lämnas in för förhandsgranskning.

Undervisning ordnas varje termin. Se noggrannare information under studieavsnittens information.

Bedömningsmetoder och kriterier

Studiehelheten bedöms med vitsordet "godkänd".

EN: Target group
Compulsory module.

Timing

To be completed simultaneously with the dissertation work. The general competence studies module has to be completed before leaving the dissertation to preliminary examination.

Assessment practices and criteria

Grading: Pass.

Study module structure	Credits
PHD-997 GENERAL COMPETENCE STUDIES	10 cr
SCIENTIFIC THINKING (- WHAT IS SCIENCE?) (grouping module)	
PHD-103 Philosophy of science	1-5 cr
PHD-104 HCAS Winter/Summer School	3 cr
PHD-151 Optional studies in scientific thinking 1	1-10 cr
PHD-152 Optional studies in scientific thinking 2	1-10 cr
PHD-153 Optional studies in scientific thinking 3	1-10 cr
PHD-102 Academic rhetoric and argumentation	1-5 cr
SCIENTIFIC COMMUNICATION AND SOCIETAL IMPACT (grouping module)	
PHD-201 Academic Pitching	1-5 cr
PHD-202 Academic Writing and Editing	2 cr
PHD-203 Conference presentation	2 cr
HEALTH-124 Facing the Final Frontier: Preparing the Doctoral Dissertation Book for Health Scientists	1 cr
PHD-205 Grant Writing I	1 cr
PHD-206 Grant Writing II	2 cr
PHD-207 Kirjoittamiskäytännöt: Luovuutta ja ideoita väitöskirjan kirjoitusprosessiin	1 cr
PHD-208 Luova tieteellinen kirjoittaminen	1-5 cr
PHD-251 Optional studies in scientific communication and societal impact 1	1-10 cr

PHD-252 Optional studies in scientific communication and societal impact 2	1-10 cr
PHD-253 Optional studies in scientific communication and societal impact 3	1-10 cr
PHD-218 Popularisation of science	1-2 cr
PHD-204 Poster presentation and data visualisation	1-2 cr
PHD-209 Principles of Peer Review	1 cr
PHD-211 Principles of Scientific Writing for Health Scientists 2 - from proposal to paper	2 cr
PHD-210 Principles of Scientific Writing for Health Scientists	2 cr
PHD-212 Science in Society	5 cr
PHD-217 Storytelling for Health Scientists	3 cr
TIVI-Y911 Tiedeviestintä: Asiantuntijana digitaalisessa mediassa	5 cr
TIVI-Y912 Scientific journalism	5 cr
TIVI-Y913 Tiedeviestintä Tieteen popularisointi	5 cr
PHD-213 Tutkijan verkkokirjoittaminen	3 cr
PHD-214 Väittelijän vuorovaikutusosaaminen	2 cr
PHD-215 Writing Doctoral Research for Health Scientists	3 cr
PHD-216 Writing Journal Article in Twelve Weeks	5 cr
PVM-604 Communicating Science and Expertise	5 cr
PVM-V308 Science Communication	5 cr
SUKU-S330 Concept analysis and terminology work	5 cr
WORKING LIFE SKILLS (grouping module)	
HEALTH-114 Biomedical view to patenting	2 cr
PED511 UP1 Learning in Higher Education	5 cr
PED5121 UP 2.1 Constructive Alignment in Course Design	5 cr
PED5122 UP 2.2 Assessment of Learning and Giving Feedback	5 cr
PHD-101 PhD Career course	2 cr
PHD-303 Project management and leadership	2 cr
PHD-305 Biobusiness course	3 cr
PHD-306 Conference Organising	1-5 cr
PHD-307 Doctoral programme/school or university activities	1-2 cr
PHD-308 Mielekäs akateeminen työ	3 cr
PHD-309 Research funding	1-2 cr
PHD-310 Language studies supporting working life skills	1-5 cr
PHD-311 Ajanhallinnan haasteet muun työn ohessa väitöskirjaa tekeville	2 cr
PHD-351 Optional studies in professional development 1	1-10 cr
PHD-352 Optional studies in professional development 2	1-10 cr
PHD-353 Optional studies in professional development 3	1-10 cr
PHD-404 Industrial property rights	2 cr
PHD-503 Leading a creative expert organisation	1-5 cr
HEALTH-111 Optional courses: Management and Entrepreneurship	1-5 cr
RESPONSIBLE RESEARCH (grouping module)	
LIB-900 Information Management for Doctoral Researchers	1 cr
NEU-603 Laboratory animal science	1-5 cr
PHD-301 Open Science	1 cr
PHD-302 Introduction to Open Data Science	5 cr
PHD-405 Doctoral Education Base Camp	3 cr
PHD-406 Responsible Research and Innovation (RRI)	1 cr

PHD-451 Optional studies in responsible research 1	1-10 cr
PHD-452 Optional studies in responsible research 2	1-10 cr
PHD-453 Optional studies in responsible research 3	1-10 cr
SUST-001 Sustainability course	3 cr
TKT21018 Elements of AI: Introduction to AI	2 cr

OTHER GENERAL COMPETENCE STUDIES (grouping module)

FILTERED COURSES

NEUBM-999 Doctoral Thesis

NEUBM-999 Doctoral Thesis
NEUBM-999 Doctoral Thesis

Abbreviation: Doctoral Thesis

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	0 cr
Languages	English, Finnish
Grading scale	Fail-Pass-Pass with Distinction
University	University of Helsinki
Responsible organisation	Doctoral Programme Brain and Mind 100%
Responsible person	⚠ [information missing], Responsible teacher
Study level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

PHD-401 Research Ethics

PHD-401 Tutkimusetiikka
PHD-401 Forskningsetik

Abbreviation: Tutkimusetiikka

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	1 Aug 2023-31 Jul 2026
Credits	1-2 cr
Languages	Finnish, English
Grading scale	Pass-Fail
University	University of Helsinki
Responsible organisation	University of Helsinki Doctoral School 100%
Responsible person	Simo Kyllönen, Responsible teacher
Study level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Humanities

Prerequisites

FI:

Suositellut esitiedot

Tämän opintojakson lisäksi teologian tohtoriohjelman opiskelijan tulee suorittaa riittävä määrä muita tieteenalaopintoihin kuuluvia opintojaksoja.

SV:

Suositellut esitiedot

Tämän opintojakson lisäksi teologian tohtoriohjelman opiskelijan tulee suorittaa riittävä määrä muita tieteenalaopintoihin kuuluvia opintojaksoja.

EN:

Suositellut esitiedot

Tämän opintojakson lisäksi teologian tohtoriohjelman opiskelijan tulee suorittaa riittävä määrä muita tieteenalaopintoihin kuuluvia opintojaksoja.

Equivalences to other studies

920201 Research Ethics

or

921181 Research Ethics, online course

or

HKP-912 Research Ethics: Basics

or

DONAS-401 Research Ethics

or

YEB-114 Research ethics in Biosciences

or

YEB-117 Research ethics in Biosciences (online course)

or

921180 Research Ethics for Health Scientists

or

922502 Research Ethics

or

399674 Research ethics for health scientists

Equivalences (free text field)

SV:
PHD-401
Research Ethics

EN:
PHD-401
Forskningsetik

Learning outcomes

FI: Opintojakson suoritettuaan opiskelija on kehittänyt taitojaan seuraavilla osa-alueilla:

- tunnistaa ja analysoida keskeisimpiä tutkimuseettisiä kysymyksiä
- osaa ottaa huomioon tutkimussuunnitelmien esiin nostamia eettisiä kysymyksiä ja haasteita ja vastata niihin
- tunnistaa ja ymmärtää tutkimusta ohjaavia keskeisiä eettisiä periaatteista ja niiden soveltamista tutkimuksen tekemiseen

- ymmärtää hyvän tieteellisen käytännön periaatteet ja sen loukkauksien käsittelyprosessin, sekä tutkimusluvan hakemisen ja tutkimuksen eettisen ennakkoarvioinnin menettelyt.
- tunnistaa tutkijan vastuut ja oikeudet
- ymmärtää eettisten päätösten ja valintojen vaikutukset yhteiskuntaan ja tutkimusyhteisöön.

SV: Opintojakson suoritettuaan opiskelija on kehittänyt taitojaan seuraavilla osa-alueilla:

- tunnistaa ja analysoida keskeisimpiä tutkimuseettisiä kysymyksiä
- osaa ottaa huomioon tutkimussuunnitelmien esiin nostamia eettisiä kysymyksiä ja haasteita ja vastata niihin
- tunnistaa ja ymmärtää tutkimusta ohjaavia keskeisiä eettisiä periaatteista ja niiden soveltamista tutkimuksen tekemiseen
- ymmärtää hyvän tieteellisen käytännön periaatteet ja sen loukkauksien käsittelyprosessin, sekä tutkimusluvan hakemisen ja tutkimuksen eettisen ennakkoarvioinnin menettelyt.
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- ymmärtää eettisten päätösten ja valintojen vaikutukset yhteiskuntaan ja tutkimusyhteisöön.

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- tunnistaa ja analysoida keskeisimpiä tutkimuseettisiä kysymyksiä
- osaa ottaa huomioon tutkimussuunnitelmien esiin nostamia eettisiä kysymyksiä ja haasteita ja vastata niihin
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- tunnistaa tutkijan vastuut ja oikeudet
- ymmärtää eettisten päätösten ja valintojen vaikutukset yhteiskuntaan ja tutkimusyhteisöön.

Content

FI: Opintojaksossa käsitellään tutkimusetiikkaan liittyviä kysymyksiä erityisesti humanistis-yhteiskuntatieteellisillä aloilla. Kurssimuotoisen opetuksen kautta hankittua osaamista on mahdollista täydentää kirjatentillä tai esseellä.

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Additional information

FI:

Suoritustavat (yleinen kuvaus)

Verkkokurssi (1 op), verkkokurssi ja lähiopetus (2 op) tai muu ohjaajan kanssa sovittava suoritustapa (kirjatentti, essee).

Arviointimenetelmät ja -kriteerit

Jatko-opintojen opintojaksot arvioidaan pääsääntöisesti kaksiportaisella asteikolla hylätty - hyväksytty. Kurssimuotoisen opetuksen osalta arvosteluasteikko ilmoitetaan erikseen.

Oppimista tukevat aktiviteetit ja menetelmät

Opintojaksolla käytetään opiskelumenetelmiä, jotka edesauttavat itsenäisen ja kriittisen tutkijanotteen rakentumista ja oman tutkimusalan syvempää ymmärrystä.

Järjestämisajankohta/-kohdat

Kurssia toteutetaan syys- ja kevätlukukausilla

Suositeltava suoritusajankohta

Opintojen alussa

Opintokokonaisuudet

Tieteenalaopinnot

Opetuskielet

suomi

svenska

English

EQF-taso

tohtorin tutkinto / EQF-taso 8

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Suoritustavat (yleinen kuvaus)

Verkkokurssi (1 op), verkkokurssi ja lähiopetus (2 op) tai muu ohjaajan kanssa sovittava suoritustapa (kirjatentti, essee).

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Verkkokurssi (1 op), verkkokurssi ja lähiopetus (2 op) tai muu ohjaajan kanssa sovittava suoritustapa (kirjatentti, essee).

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Jatko-opintojen opintojaksot arvioidaan pääsääntöisesti kaksiportaisella asteikolla hylätty - hyväksytty. Kurssimuotoisen opetuksen osalta arvosteluasteikko ilmoitetaan erikseen.

Oppimista tukevat aktiviteetit ja menetelmät

Opintojaksolla käytetään opiskelumenetelmiä, jotka edesauttavat itsenäisen ja kriittisen tutkijanotteen rakentumista ja oman tutkimusalan syvempää ymmärrystä.

Järjestämisajankohta/-kohdat

Kurssia toteutetaan syys- ja kevätlukukausilla

Suositeltava suoritusajankohta

Opintojen alussa

Opintokokonaisuudet

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tohtorin tutkinto / EQF-taso 8

Study materials

FI: Kurssimuotoisen opetuksen osalta ilmoitetaan tarvittaessa erikseen suoritettava kirjallisuus. Mikäli opintojakso suoritetaan muulla tavoin, kirjallisuudesta ja aineistosta sovitaan väitöskirjatyön ohjaajan kanssa.

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Completion method and assessment items	Recurrence	Credits
Method 1		1 cr
Participation in teaching (min)		1 cr
Method 2		1-2 cr
Independent study		1-2 cr

NEUBM-010 Book exam 1

NEUBM-010 Book exam 1

NEUBM-010 Book exam 1

Abbreviation: Book exam 1

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English, Finnish
Grading scale	General scale, 0-5

University	University of Helsinki
Responsible organisation	Doctoral Programme Brain and Mind 100%
Responsible person	Kai Kaila, Responsible teacher
Study level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Learning outcomes

EN: The aim of the book exam is to deepen students' theoretical knowledge in the field of their doctoral thesis and to provide basic knowledge in other fields of neuroscience.

Additional information

EN: Recommended to be passed during the early stages of doctoral studies. Obligatory for B&M doctoral students.

Study materials

EN: The primarily recommended book is Kandel's Principles of Neural Science (latest edition, available also as an e-book in the UH library). For a 5 credit examination, seven exam options including selected parts/chapters of the Kandel's book are available in Examinarium. First enrol in Sisu to NEUBM-010 and then book your exam time and room in the Examinarium system. The exam can also be taken in smaller parts. Note, if you have already completed an exam/course on the Kandel's book (or Purves: Neuroscience) during your previous studies, you can also take the exam on another book if you wish. In this case, you can discuss with your supervisor, coordinating academic and/or Thesis Committee Members book options that best support your thesis work or future career. Exam book(s) may also be supplemented with review articles.

To organize a personalised NEUBM-010 B&M book exam, please contact katri.wegelius@helsinki.fi.

Literature

https://helsinki.primo.exlibrisgroup.com/discovery/search?query=any,contains,9928880423506253&tab=LibraryCatalog&search_scope=MyInstitution&sortby=date_d&vid=358UOH_INST:VU1&facet=frbrgroupid,include,9016041438705483954&lang=en&offset=0

Completion method and assessment items	Recurrence	Credits
Method 1		5 cr
Exam		5 cr

NEUBM-101 B&M Symposium poster

NEUBM-101 B&M Symposium poster

NEUBM-101 B&M Symposium poster

Abbreviation: B&M poster

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	1-2 cr
Languages	English, Finnish
Grading scale	Pass-Fail
University	University of Helsinki
Responsible organisation	Doctoral Programme Brain and Mind 100%
Responsible person	Katri Wegelius, Responsible teacher
Study level	Postgraduate studies

Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Learning outcomes

EN: The B&M Symposium creates a forum for researchers from different fields of neuroscience to meet, present their data and advance scientific discussion between doctoral candidates and senior researchers. Participants will gain in-depth knowledge from the symposium topics. In addition, they will learn presentation skills and have a possibility for networking with other researchers within the field.

Content

EN: International interdisciplinary symposium on neuroscience including talks from international experts, panel discussion and oral/poster presentations by doctoral candidates.

Additional information

EN: Target group
Annual participation in the B&M symposia is recommended for B&M doctoral candidates.

Participation in one B&M symposium with poster/oral presentation is obligatory during the doctoral studies.

Timing

Organized annually during the fall term.

Completion methods

Poster or brief talk to present the results of your doctoral thesis project, 1 credit.

In addition, you can gain 1 credit for participation in the symposium by writing a learning diary for the lectures.

Assessment practices and criteria

Scale is pass/fail. Participation may be monitored by an attendance list or a learning diary.

Responsible person

B&M planning officer Katri Wegelius

Study materials

EN: Possible optional selected literature will be provided by the organisers for the symposium participants.

Completion method and assessment items	Recurrence	Credits
Method 1		1-2 cr
Participation in teaching		1-2 cr

NEUBM-011 Book exam 2

NEUBM-011 Book exam 2

NEUBM-011 Book exam 2

Abbreviation: Book exam 2

Curriculum periods	2023-24, 2024-25, 2025-26

Validity period	since 1 Aug 2023
Credits	1-5 cr
Languages	English, Finnish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Doctoral Programme Brain and Mind 100%
Responsible persons	Kai Kaila, Responsible teacher Katri Wegelius, Administrative person
Study level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Learning outcomes

EN: The aim of the book exam is to deepen students' theoretical knowledge in the field of their doctoral thesis and to provide basic knowledge in other fields of neuroscience.

Content

EN: An optional book exam to be passed during the doctoral studies.

Additional information

EN: You can discuss with your supervisors, coordinating academic and/or Thesis Committee Members the book options that best support your thesis or your future career. The exam book(s) can also be supplemented with review articles.
The general guideline is around 100 pages of reading per credit.

To organize a personalised NEUBM-011 B&M book exam, please contact katri.wegelius@helsinki.fi.

Completion method and assessment items	Recurrence	Credits
Method 1		1-5 cr
Exam		1-5 cr

NEUBM-205 Advances in neuroimmunology and neuroinflammation

NEUBM-205 Advances in neuroimmunology and neuroinflammation

NEUBM-205 Advances in neuroimmunology and neuroinflammation

Abbreviation: Advances in neu

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	3 cr
Languages	English
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Doctoral Programme Brain and Mind 100%
Responsible persons	⚠ [information missing], Responsible teacher Katri Wegelius, Administrative person
Study level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Basic neuroscience and physiology courses.

Learning outcomes

EN: After the course, the students will:

- understand the basic principles of brain-immune interactions.
- be familiar with the most commonly used experimental approaches in neuroinflammation and neuroimmunology (animal models, imaging techniques, advanced microscopy, measurement of inflammatory mediators, cell biological approaches, etc).
- be able to apply the understanding of basic concepts and approaches in neuroimmunology to other fields of neuroscience and critically judge new findings.
- be better equipped to take neuroinflammation aspects into consideration in their own research

Additional information

EN: Completion methods
Lectures, independent work and exam.

Organized every other year.

Contents

The course consists of lectures on current topics of the field, including basic lectures on the immune- and the nervous system, their interactions, the regulation of immune processes by the central nervous system and the role of inflammatory processes in brain diseases.

Responsible person

Dr. Ádám Dénes (Institute of Experimental Medicine, Hungary), contact person katri.wegelius@helsinki.fi

Study materials

EN: Course reading material will be provided by the teacher.

Completion method and assessment items	Recurrence	Credits
Method 1		3 cr
Participation in teaching		3 cr

NEUBM-211 Microglia and recent technologies

NEUBM-211 Microglia and recent technologies

NEUBM-211 Microglia and recent technologies

Abbreviation: Microglia in he

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	3 cr
Languages	English
Grading scale	Pass-Fail
University	University of Helsinki
Responsible organisation	Doctoral Programme Brain and Mind 100%

Responsible person	Vassileios Stratoulias, Responsible teacher
Study level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Target group

- PhD researchers
- MSc students
- Scientists with interest in microglial biology

Learning outcomes

EN: The course aims at participants acquiring a step-wise and comprehensive understanding of microglia in health and disease, current challenges, and opportunities. After the course, the participants should be able to:

- describe microglia functions
- understand older and current nomenclature, and their pitfalls
- understand methodology and technology used to study microglia
- design experiments to study microglia

Content

EN:
The core comprises of lectures on

- Introduction to microglial biology, function and nomenclature
- Tools to study microglia
- Microglia during development
- Human stem cell derived microglia
- Microglia in Alzheimer
- Microglia in brain injury

Study materials

EN: Combination of lectures, pre- and post-lecture assignments.

- Pre-assignments are based on research articles.
- Post-lecture assignments include poster preparation and reflective journals.

Completion method and assessment items	Recurrence	Credits
Method 1		3 cr
Participation in teaching		3 cr

NEUBM-301 Biological psychiatry 1

NEUBM-301 Biological psychiatry 1
NEUBM-301 Biological psychiatry 1

Abbreviation: Biological psyc

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	1-2 cr

Languages	English, Finnish
Grading scale	Pass-Fail
University	University of Helsinki
Responsible organisation	Doctoral Programme Brain and Mind 100%
Responsible person	Iiris Hovatta, Responsible teacher
Study level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Learning outcomes

EN: After the course, the student knows what the current themes of research in biological psychiatry are. In addition, they know how to prepare and present a poster or oral talk. They will also learn to summarize essential content of the presentations and reflect their learning in a wider context. The symposium also enhances networking and possibilities for collaboration.

Content

EN: The symposium consists of presentations of various fields of biological psychiatry, including human genetic and imaging studies, and functional, pharmacological and genetic analyses in model organisms.

Additional information

EN: Timing
Every 1-2 years, period II or period IV

Completion methods

The symposium involves submitting an abstract, presenting a poster or oral presentation, and attending talks by other presenters and the poster session, and writing an essay/learning diary. Attendance to the symposium is required to pass the course.

Assessment practices and criteria

Scale is pass/fail

Responsible person

Professor Iiris Hovatta

EQF level 8

Completion method and assessment items	Recurrence	Credits
Method 1		1-2 cr
Participation in teaching		1-2 cr

NEUBM-302 Biological psychiatry 2

NEUBM-302 Biological psychiatry 2

NEUBM-302 Biological psychiatry 2

Abbreviation: Biological psyc

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023

Credits	1-2 cr
Languages	English, Finnish
Grading scale	Pass-Fail
University	University of Helsinki
Responsible organisation	Doctoral Programme Brain and Mind 100%
Responsible person	Iiris Hovatta, Responsible teacher
Study level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Learning outcomes

EN: After the course, the student knows what the current themes of research in biological psychiatry are. In addition, they know how to prepare and present a poster or oral talk. They will also learn to summarize essential content of the presentations and reflect their learning in a wider context. The symposium also enhances networking and possibilities for collaboration.

Content

EN: The symposium consists of presentations of various fields of biological psychiatry, including human genetic and imaging studies, and functional, pharmacological and genetic analyses in model organisms.

Additional information

EN: Timing
Every 1-2 years, period II or period IV

Completion methods

The symposium involves submitting an abstract, presenting a poster or oral presentation, and attending talks by other presenters and the poster session, and writing an essay/learning diary. Attendance to the symposium is required to pass the course.

Assessment practices and criteria

Scale is pass/fail

Responsible person

Professor Iiris Hovatta

EQF level 8

Completion method and assessment items	Recurrence	Credits
Method 1		1-2 cr
Participation in teaching		1-2 cr

NEUBM-303 NeuPhar 1

NEUBM-303 NeuPhar 1
NEUBM-303 NeuPhar 1

Abbreviation: NeuPhar 1

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	2-5 cr
Languages	English, Finnish
Grading scale	Pass-Fail

University	University of Helsinki
Responsible organisation	Doctoral Programme Brain and Mind 100%
Responsible person	Teemu Aitta-aho, Responsible teacher
Study level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: The course content provides latest knowledge of neuropharmacology topics, and therefore some prior studies in the field of neuropharmacology is suitable to enable full participation to the course themes. Please contact course supervisor if in doubt.
Some prior studies of neuropharmacology will be beneficial for the enrolled students. E.g. quick browsing-reading of Molecular Neuropharmacology textbook, e.g. Molecular Neuropharmacology: A Foundation for Clinical Neuroscience, McGraw-Hill (Nestler, Kenny, Russo, Schaefer)

Learning outcomes

EN: Generally to give further understanding of
1. the mechanisms of action of neuropsychopharmacological drugs
2. the methods how to study the drug effects preclinically and clinically
3. the relevant disease models and main pathophysiological features of the neurological and mental illnesses
4. the future ideas in related drug development.

and especially of long-term effects of drugs of abuse on synaptic neuroplasticity, brain structure and development, and behavior.

Content

EN: The course can include lectures, student seminars on pre-selected articles and reviews, pre-seminar before two-day lecture period, and a post-seminar with written reports on the topics of the lectures, and an optional exam that is given two weeks after the course.

Additional information

EN: Timing: every other year in period IV.
Each NeuPhar course has a different theme and content so students can complete the course twice (as NEUBM-303 and NEUBM-304).

Target group:

PhD students and advanced level Master's students in the following fields (not exhaustive): Neuroscience (various subfields), Psychology, Neurology, Psychiatry, Pharmacology, Addiction Medicine.

Completion methods:

Participation in pre-seminar, lectures, self-study on given publications and reviews, and written examination.

Assessment practices:

Study credits:

- 2 cr: Participation (100%).
- 5 cr: Participation and passed exam. The exam questions will be related to the lectures and the selected review articles.

Participation in the lectures may be checked by the participation list signed in the lecture room, the Zoom report and/or a learning diary.

Study materials

EN: Newly selected reviews, neuropharmacology textbook as a basis, student-generated presentations.

Completion method and assessment items	Recurrence	Credits
Method 1		2-5 cr
Participation in teaching		2-5 cr

NEUBM-304 NeuPhar 2

NEUBM-304 NeuPhar 2

NEUBM-304 NeuPhar 2

Abbreviation: NeuPhar 2

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	2-5 cr
Languages	English, Finnish
Grading scale	Pass-Fail
University	University of Helsinki
Responsible organisation	Doctoral Programme Brain and Mind 100%
Responsible person	Teemu Aitta-aho, Responsible teacher
Study level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: The course content provides latest knowledge of neuropharmacology topics, and therefore some prior studies in the field of neuropharmacology is suitable to enable full participation to the course themes. Please contact course supervisor if in doubt.
Some prior studies of neuropharmacology will be beneficial for the enrolled students. E.g. quick browsing-reading of Molecular Neuropharmacology textbook, e.g. Molecular Neuropharmacology: A Foundation for Clinical Neuroscience, McGraw-Hill (Nestler, Kenny, Russo, Schaefer)

Learning outcomes

EN: Generally to give further understanding of

1. the mechanisms of action of neuropsychopharmacological drugs
2. the methods how to study the drug effects preclinically and clinically
3. the relevant disease models and main pathophysiological features of the neurological and mental illnesses
4. the future ideas in related drug development.

and especially of long-term effects of drugs of abuse on synaptic neuroplasticity, brain structure and development, and behavior.

Content

EN: The course can include lectures, student seminars on pre-selected articles and reviews, pre-seminar before two-day lecture period, and a post-seminar with written reports on the topics of the lectures, and an optional exam that is given two weeks after the course.

Additional information

EN: Timing: every other year in period IV.
Each NeuPhar course has a different theme and content so students can complete the course twice (as NEUBM-303 and NEUBM-304).

Target group:

PhD students and advanced level Master's students in the following fields (not exhaustive): Neuroscience (various subfields), Psychology, Neurology, Psychiatry, Pharmacology, Addiction Medicine.

Completion methods:

Participation in pre-seminar, lectures, self-study on given publications and reviews, and written examination.

Assessment practices:

Study credits:

- 2 cr: Participation (100%).
- 5 cr: Participation and passed exam. The exam questions will be related to the lectures and the selected review articles.

Participation in the lectures may be checked by the participation list signed in the lecture room, the Zoom report and/or a learning diary.

Study materials

EN: Newly selected reviews, neuropharmacology textbook as a basis, student-generated presentations.

Completion method and assessment items	Recurrence	Credits
Method 1		2-5 cr
Participation in teaching		2-5 cr

NEUBM-309 Computational neuroscience

NEUBM-309 Computational neuroscience
NEUBM-309 Computational neuroscience

Abbreviation: Computational n

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	1-3 cr
Languages	English, Finnish
Grading scale	Pass-Fail
University	University of Helsinki
Responsible organisation	Doctoral Programme Brain and Mind 100%
Responsible persons	Simo Vanni, Responsible teacher Katri Wegelius, Administrative person
Study level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: This is an entry-level course on computational neuroscience. It requires no earlier studies on the topic, but familiarity with basic neuroscience is recommended.

Learning outcomes

EN: After completing the course, the student....

- knows concepts of theoretical neuroscience and contemporary models of mammalian brain structure and function; understands benefit of model- based experimental neuroscience; learns prominent neural simulation platforms; learns the basics of multidimensional data analysis; knows likely application in clinical medicine
- The aim is to evoke interest in the field to target further self-learning towards relevant individual application area.

Content

EN: The course covers topics listed below, including preceding review article as preparatory material, and two days of lectures by experts in the field.
History, motivation, aim, clinical potential

Modeling neural function

- biophysics
- models for synapse, membrane, cell and systems

Simulating neural systems

- simulation platforms (NEST, NEURON, Brian2) and their strengths and weaknesses

Analyzing high-dimensional data

- introduction to contemporary methods

Software and hardware implementation of the models

- restrictions and potential of distinct computer platforms, brain-computer interface, embedded systems

Neuroinformatics

- motivation, platforms, comparative neurobiology

Computational neurology and psychiatry

- introduction to human brain as an organ and as a network
- epilepsy, schizophrenia models, simulation platform: the Virtual Brain

Additional information

EN: Timing: Organized every other year during autumn term
Completion methods

1. Pre-reading before the course: review articles on course topics in Moodle.
2. Lectures (compulsory participation)
3. Exam

Assessment practices and criteria

- 1 cr: pre-reading material and full participation in all lectures is required. Grading scale pass/fail.
- 3 cr: pre-reading material, full participation in all lectures and a passed exam is required. Grading scale 0-5 based on the exam.

Participation in the lectures may be checked by the participation list signed in the lecture room, the Zoom report and/or a learning diary.

Study materials

EN: Reading material for the exam (in addition to the review articles): Sterrat, Graham, Gillies and Willshaw : Principles of Computational Modelling in Neuroscience, 2011, Cambridge University Press, chapters 2,3,4,7,8 and 9 (178 pages). The book is available as an e-book at the University of Helsinki Helka library services.

Completion method and assessment items	Recurrence	Credits
Method 1		1-3 cr
Participation in teaching		1-3 cr

NEUBM-507 B&M "What's up" Journal Club

NEUBM-507 B&M "What's up" Journal Club

NEUBM-507 B&M "What's up" Journal Club

Abbreviation: B&M JC

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	1-2 cr
Languages	English, Finnish
Grading scale	Pass-Fail
University	University of Helsinki
Responsible organisation	Doctoral Programme Brain and Mind 100%
Responsible persons	Eva Ruusuvuori, Responsible teacher Henna-Kaisa Wigren, Responsible teacher Katri Wegelius, Administrative person
Study level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Tweet text

EN: JC is a forum for insightful and relaxed discussions. It focuses on current and even controversial discoveries every neuroscientist should be able to comment.

Prerequisites

EN: Previous experience in neuroscientific research and background studies on the basic mechanisms of the nervous system (e.g. Purves at al., Kandel et.al, or similar knowledge)

Learning outcomes

EN: After this course, the student

- has gained experience in critical reading
- has learned to participate in and facilitate constructive scientific dialogue/argumentation
- is able to reflect and communicate novel scientific findings clearly and coherently

Content

EN: Each topic/article is chosen and introduced by student(s) after which general discussion with other students and a visiting expert continues.
Students are expected to:

1) clearly summarize the relevant and novel content of the research article

2) critically evaluate it

3) communicate and discuss the findings in the context of previous studies

Additional information

EN: Completion methods
The journal club will be organized appr. once a month. Before each session the students are expected to critically read the chosen article(s). Students will prepare and present a chosen research article to their peers and act as a chair in the scientific discussion.

Attendance in all JC sessions during spring & autumn terms, presentation of one article and acting as a discussion chair will give 2 cr. Presentation of one article and attendance in 5 JC sessions will give 1 cr

Assessment methods and criteria
Assessment (pass/fail) is based on article presentation and activity in the class

Target group

Doctoral candidates and master's students from neuroscience or related fields. Suitable for exchange students. Everyone interested in the topics of articles are encouraged to attend.

Teaching period when the course will be offered

Periods I-IV

Language of instruction

English

EQF level: 8

Study materials

EN: The articles are chosen together by the responsible teachers and students.

Completion method and assessment items	Recurrence	Credits
Method 1		1-2 cr
Participation in teaching		1-2 cr

NEUBM-533 Functional neuroanatomy
NEUBM-533 Funktionaalinen neuroanatomia
NEUBM-533 Funktional neuroanatomi

Abbreviation: Funktionaalinen

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	3 cr
Languages	English, Finnish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Doctoral Programme Brain and Mind 100%
Responsible persons	Claudio Rivera Baeza, Responsible teacher Katri Wegelius, Administrative person
Study level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Basic neuroscience and physiology courses

Learning outcomes

EN: The main objective of the course is to give a survey of the major brain systems from a functional perspective. After this course the students will be familiar with the anatomy and basic function of important structures of the brain. They will be able to: 1) describe physical structures, organization, and function of important brain areas using appropriate anatomical terminology. 2) understand the development, maturation and malfunction of these structures. 3) get hands on experience with advance methods for studying brain function.

Content

EN: The course will cover topics such as:

- The limbic system
- The frontal cortex
- Basal ganglia
- The geniculate gyrus
- Temporal lobe
- Spinal cord and peripheral nervous system
- Vasculature
- Brain stem and Cerebellum
- Sensory system

Practical demonstrations in in vivo optogenetics in combination with electrophysiology as well as in vivo calcium imaging.

Additional information

EN: Timing
Every other year.

Completion methods

Lectures, demonstrations, independent work, and exam.

Assessment practices and criteria

0-5

Study materials

EN: Course reading material will be provided by the teacher.

Completion method and assessment items	Recurrence	Credits
Method 1		3 cr
Participation in teaching		3 cr

NEUBM-610 Big questions in neuroscience and current limits of knowledge

NEUBM-610 Big questions in neuroscience and current limits of knowledge

NEUBM-610 Big questions in neuroscience and current limits of knowledge

Abbreviation: Big questions i

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023

Credits	1-2 cr
Languages	English, Finnish
Grading scale	Pass-Fail
University	University of Helsinki
Responsible organisation	Doctoral Programme Brain and Mind 100%
Responsible person	Iiris Hovatta, Responsible teacher
Study level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Learning outcomes

EN: After this course, the student knows what the current themes of research and key questions in neuroscience are. He/she is familiar with the methods used in neuroscience research and what the major scientific and technical limits of neuroscience are at the moment. He/she will know how to write an essay reflecting the content of a seminar presentation.

Additional information

EN:

Timing

Periods I-IV

Completion methods

The course involves listening to lectures and writing essays. 5 lectures + essays = 1 cr, 10 lectures + essays = 2 cr.

The course can be completed online in Moodle.

Assessment practices and criteria

Scale is pass/fail.

Responsible person

Professor Iiris Hovatta

EQF level 8

Completion method and assessment items	Recurrence	Credits
Method 1		1-2 cr
Participation in teaching		1-2 cr

NEUBM-611 Milestones in the history of neuroscience

NEUBM-611 Milestones in the history of neuroscience

NEUBM-611 Milestones in the history of neuroscience

Abbreviation: Milestones in t

Curriculum period	2023-24

Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English, Finnish
Grading scale	Pass-Fail
University	University of Helsinki
Responsible organisation	Doctoral Programme Brain and Mind 100%
Responsible person	Katri Wegelius, Administrative person
Study level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Completion method and assessment items	Recurrence	Credits
Method 1		5 cr
Participation in teaching		5 cr
Method 2		5 cr
Exam		5 cr
Method 3		5 cr
Independent study		5 cr

NEUBM-771 Other elective studies

NEUBM-771 Muut tieteenalan opinnot

NEUBM-771 Other elective studies

Abbreviation: Muut tieteenala

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	1-10 cr
Languages	English, Finnish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Doctoral Programme Brain and Mind 100%
Responsible person	Katri Wegelius, Responsible teacher
Study level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Completion method and assessment items	Recurrence	Credits
Method 1		1 cr
Participation in teaching (min)		1 cr
Method 2		10 cr
Participation in teaching (max)		10 cr
Method 3		1 cr
Exam (min)		1 cr
Method 4		10 cr
Exam (max)		10 cr
Method 5		1 cr
Independent study (min)		1 cr

Method 6 10 cr
Independent study (max) 10 cr

NEU-104 Integrative neurobiology

NEU-104 Integrativiinen neurobiologia
NEU-104 Integrativ neurobiologi

Abbreviation: Integrativiinen

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Neuroscience 100%
Responsible persons	Kai Kaila, Responsible teacher Katri Wegelius, Administrative person
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Courses on Cellular neuroscience and Cellular physiology are recommended before this course.

Equivalences to other studies

52265 Introduction to neurobiology

Learning outcomes

EN: After completion of the course, the student has comprehensive insight into brain functions ranging from signaling mechanisms at the cellular level to behavioral, cognitive, neuroendocrine and metabolic processes and their interrelations within an organism. Lots of emphasis is put on critical evaluation of diverse techniques and interpretation of data and concepts, as well as on their historical aspects. Brain functions and disorders as well as standard clinical concepts will be discussed and re-examined in an evolutionary context.

Content

EN: The aim of the course is to give a thorough overview of neurobiology and its relationships to other fields of science, research methods, and to history of key ideas and ideologies. Specific topics include biophysics of neuronal membranes, neuronal signaling, synaptic function and plasticity, brain disorders, immune responses, neuroinflammation, genes and brains, learning and memory, motor system, neuroendocrinology, neuroethology, sensations and perception, and neurobiology of consciousness.

Additional information

EN: Target group
Students from different disciplines, including biology, molecular biosciences, neuroscience, psychology, medicine, physics and biomedical engineering.

Timing

Period II. Recommended to be completed during the first year of studies in the Master’s Programme in Neuroscience. Compulsory for students choosing the Neuroscience study track.

Completion methods

The course consists of lectures (appr. 35 h) and independent studying (appr. 100h). To complete the course, the students need to attend the lectures (minimum of 70%) and to pass the final exam.

Assessment practices and criteria

Examination based on lectures and the additional material (see above). The exam tests the students' comprehension of major concepts as well as important data-based knowledge in neuroscience. Grading scale 0-5.

Responsible teacher

Professor Kai Kaila (kai.kaila@helsinki.fi)

Primary contact for practical matters related to the course: planning officer Katri Wegelius (Katri.wegelius@helsinki.fi)

EQF level: 7

Study materials

EN: Lecture handouts and notes. Selected chapters of relevant neuroscience text books and review articles may be used as background reading material.

Completion method and assessment items	Recurrence	Credits
Method 1		5 cr
Participation in teaching		5 cr

NEU-502 Synaptic Signaling and Plasticity

NEU-502 Synaptinen signalointi ja plastisuus
NEU-502 Synaptisk signalering och plasticitet

Abbreviation: Synaptinen sign

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Neuroscience 100%
Responsible persons	Sari Lauri, Responsible teacher Kari Keinänen, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Basic knowledge of neurobiology as well as cell and molecular biology is assumed.

Learning outcomes

EN: The students will familiarize with the concept, mechanisms and consequences of synaptic signaling and activity–dependent synaptic plasticity in the central nervous system. On completion of the course, the student has gained an understanding of the molecular mechanisms of chemical neurotransmission, can explain how neurotransmitters act on their receptors and induce downstream signals and is able to integrate this information into a physiological context. The student has also obtained practice in critical reading and discussing literature and communicating scientific knowledge.

Content

EN: The course addresses the mechanisms underlying fast synaptic transmission and activity-dependent synaptic plasticity in the brain. The topics include structure and function of ligand-gated ion channel and G-protein coupled receptors for major neurotransmitters, mechanisms underlying neurotransmitter release as well as induction and expression of Hebbian and homeostatic plasticity. The focus is on the molecular mechanisms mediating glutamatergic transmission, but modulation of these mechanisms in response to physiological signals as well as its relevance for circuit function and behavior will be covered as well.

Additional information

EN: Target group
Advanced BSc, MSc and PhD students of Neuroscience, Molecular Biosciences and related Life Sciences.

Timing

Period 3 or 4

Assessment practices and criteria

Grade (scale 0-5) is based on attendance and activity in class, presentation and the exam.

Completion

Lectures, seminars (incl. own oral presentation and written summary) and an exam. Contact teaching approximately 35 h, independent and group work 100 h.

Relations to other study units

The course provides useful background for studies of neurobiology, pharmacology and cell and molecular biology.

Responsible person

Sari Lauri and Kari Keinänen

Study materials

EN: Reading list covering relevant material from neuroscience textbooks and review and research articles will be given in the beginning of and during the course.

Completion method and assessment items	Recurrence	Credits
Method 1		5 cr
Participation in teaching		5 cr

NEU-512 Animal models in behavioural neuroscience

NEU-512 Eläinmallit käyttäytymisneurotieteessä

NEU-512 Djurmodeller inom beteende-neurovetenskap

Abbreviation: Eläinmallit käy

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English

Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Neuroscience 100%
Responsible person	Vootele Voikar, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Basic knowledge in neuroscience and laboratory animal science

Learning outcomes

EN: After the course the students should be able to

- describe the general principles and basic concepts of animal models and study design in behavioural neuroscience, adhering to good scientific practice
- understand importance of species-specific characteristics in animal models
- critically evaluate the role of genetic background, sex and environmental influences on experimental outcome
- indicate appropriate tests for behavioural assessment of animal models for neuropsychiatric and neurodegenerative disorders
- describe the animal behaviour in ethological perspective

Content

EN: General principles of animal models and study design in behavioural neuroscience; Behavioural phenotyping of animal models for neuropsychiatric and neurodegenerative disorders, learning and memory; Challenges of comprehensive phenotyping – role of environment, standardization of the procedures, genetic background; Ethological perspective

Additional information

EN: Target group

1. Students of Master's Programme in Neuroscience and Doctoral Programme Brain & Mind.
2. Other MSc students and doctoral candidates

Timing

Period III or IV

Assessment practices and criteria

Full attendance at lectures and group works (minimum requirements will be defined in more detail at the beginning of the course), written exam and learning diary.

Completion methods

The course consists of lectures (~32 h), individual work (~90 h) and group work (~12 h) followed by examination

Responsible person

Vootele Voikar, vootele.voikar@helsinki.fi

EQF level: 7

Study materials

EN: List of recommended literature will be provided for course participants.

Completion method and assessment items	Recurrence	Credits
Method 1		5 cr
Participation in teaching		5 cr

NEU-521 Basic mechanisms of nervous system diseases

NEU-521 Hermoston sairauksien perusmekanismit

NEU-521 Grundläggande mekanismer bakom sjukdomar i nervsystemet

Abbreviation: Hermoston saira

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	1-5 cr
Languages	English
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Neuroscience 100%
Responsible persons	Emil Ylikallio, Responsible teacher Henna Tyynismaa, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: A prerequisite for successful completion of the course is that the student comprehends the basic concepts in genetics, molecular biology and neurobiology.

Learning outcomes

FI:

EN: After completion of the course the student:

- is familiar with clinical manifestations of selected nervous system diseases
- is familiar with the current understanding on the molecular basis and the underlying pathophysiological mechanisms of selected nervous system disorders
- has gained understanding into the research paradigms of nervous system disorders
- has gained understanding into the treatment paradigms of selected nervous system disorders

Content

EN: The lectures of the course include neurodegenerative, ischemic, neuroimmunological, neuropsychiatric and neuromuscular diseases. The lectures are given by both basic researchers and clinicians, who are experts on their topic.

Additional information

EN: Target group

1. Students of Master’s Programmes in Neuroscience and Translational Medicine, and Doctoral Programme Brain & Mind.
2. Other MSc students and doctoral candidates interested in mechanisms underlying nervous system diseases

Timing

Period III

Assessment practices and criteria

For 5 credits: Final examination based on lectures and review articles indicated by the lecturers. Grading scale of the exam 0-5.

For 1 credit: 80% attendance in the lectures. Pass-fail

Completion methods

Lectures, 80% attendance required (1 credit);

Lectures, 50% attendance required, independent reading of literature, passing of the final exam (5 credits).

Equivalences with other studies

Replaces the former course 920007 Basic mechanisms of nervous system disorders 1.5-5 cr.

Responsible person

Henna Tyynismaa, Emil Ylikallio

EQF level: 7

Study materials

EN: Lecture material and specific scientific review articles indicated by the lecturers (1-2 articles / lecture).

Completion method and assessment items	Recurrence	Credits
Method 1		5 cr
Participation in teaching + exam		5 cr
Method 2		1 cr
Participation in teaching		1 cr

NEU-531 Developmental neuroscience

NEU-531 Hermoston kehitysbiologia

NEU-531 Nervsystemets utvecklingsbiologi

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Neuroscience 100%
Responsible person	Ulla Pirvola, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Recommended prerequisites: basic knowledge of neuroscience and developmental biology

Equivalences to other studies

920002 Developmental neuroscience

Learning outcomes

EN: After completing the study unit, student can explain the main concepts and events of development of the central and peripheral nervous system and sensory organs. Student can explain and apply current methods of developmental neuroscience research.

Content

EN: Lectures and group work of the course deal with: Neuronal induction and neurogenesis; Regulation of neuronal fate; Ionic regulation of neuronal development; Axonal outgrowth and regeneration; Synaptogenesis and synaptic plasticity; Development and refinement of neuronal circuits; Gliogenesis and myelinization; Neuronal migration; Neuronal cell death; Development of the peripheral nervous system; Development of sensory systems; Developmental brain disorders.

Additional information

EN:

Target group

Open to students of the Master's Programme in Neuroscience and to master students of other degree programmes (biology, molecular biosciences, psychology, physics, biomedical engineering, medicine).

Timing

Period 3 / The course is taught annually

Completion methods

Participation in teaching (lectures, group work, final exam). The course includes compulsory face-to-face meetings and cannot be completed entirely by distance learning. Minimum of 80 % participation in lectures and group work.

Assessment practices and criteria

The exam is based on lectures and reading material indicated by lecturers. Final grading (scale 0-5) is based on the exam (80 %) and other activity during the course (20 %).

Responsible person

Ulla Pirvola

EQF level 7

Study materials

EN: Lecture material and other material assigned to the course in Moodle, including applicable parts of Kandel E. et al. Principles of Neuroscience and of Sanes D. et al., Development of the Nervous System.

Completion method and assessment items	Recurrence	Credits
Method 1		5 cr
Participation in teaching		5 cr

NEU-541 Introduction to neurobiophysics

NEU-541 Johdatus neurobiofysiikkaan

NEU-541 Introduktion till neurobiofysik

Abbreviation: Johdatus neurob

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English

Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Neuroscience 100%
Responsible person	Juha Voipio, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: Students need to have some previous knowledge of molecular and cellular neurobiology in order to be able to achieve good learning outcomes.

Learning outcomes

EN: After completing the course, students will be able to explain how electrical signals arise at the cellular level using biophysical theories and models. They know and are able to explain, in biophysical terms, structure-function relationships in ion channels, and they have acquainted themselves in detail with some ion channel structures.

Content

EN: Basic concepts and principles of ion flux-mediated signalling; the Hodgkin-Huxley model, voltage gated channels, and permeation models; physicochemical principles and molecular mechanisms of ion channel function; structure-function relationships of ion channels including mechanisms of selective permeability, gating and block; types of ion channels and their interplay at the cellular level; electrical signalling in dendrites; synaptic transmission and the origin and analysis of extracellular field potential signals.

Additional information

FI:

EN: Completion methods
Weekly written examinations (recommended method of completion) or alternatively a final exam.

Assessment practices and criteria

Grading scale 0 – 5. With weekly exams, passing the course requires passing ≥80 % of the weekly exams, and grading is based on the mean of the separately graded weekly exams.

Activities and methods in support of learning

The course consists of approximately 20 h of contact teaching and 100 h of independent studying.

Target groups

This course is well suited for students of the Master’s Programme in Neuroscience or of related Programmes, as well as for doctoral students.

Teaching period when the course will be offered

This course runs annually in spring term (periods 3 and 4).

Recommended time or stage of studies for completion

First or second year in Master's Programme, or later.

EQF level: 7

Study materials

EN: The study materials include a major part of the book by Bertil Hille, Ion Channels of Excitable Membranes, 3rd edition, 2001, Sinauer, plus some more recently published review articles and lecture handouts.

Completion method and assessment items	Recurrence	Credits
Method 1		5 cr
Participation in teaching		5 cr

NEU-542 Electrophysiological techniques

NEU-542 Sähköfysiologisen mittaustekniikan kurssi

NEU-542 Kurs i elektrofysiologisk mätteknik

Abbreviation: Sähköfysiologis

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Neuroscience 100%
Responsible person	Juha Voipio, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Tweet text

EN: Learn to understand electrophysiology, and how to properly use different microelectrode techniques

Prerequisites

EN: Previous knowledge of basic neurobiology is necessary, and some knowledge of elementary physics and electricity is helpful (but not required), for achieving good learning outcomes.

Learning outcomes

EN: Upon successful completion of the course, students gain an in-depth understanding of the implementation of microelectrode recordings in current clamp and voltage clamp modes using either sharp or patch-clamp micropipettes. They are able to explain the sources of error and critical steps in the proper use of electrophysiological equipment. Students will be able to critically read scientific papers where data have been obtained using electrophysiological methods, and they will have the theoretical knowledge that is needed when using electrophysiological methods in a wetlab.

Content

EN: 1) The theory part of the course covers the theoretical basis of electrophysiology: Basic principles and concepts of electricity; electrical properties of cells, microelectrodes and amplifiers; equivalent circuit representation; accuracy and sources of error in microelectrode measurements; single and two microelectrode current and voltage clamp techniques; other microelectrode techniques; mechanisms of noise coupling and means for noise reduction; safety in an electrophysiology laboratory.
2) The theoretical knowledge will then be repeated and deepened in hands-on exercises, first using simple circuits and basic recording devices, and then with passive and active model cells and research instruments. Students will learn how to properly use equipment in current and voltage clamp experiments when using one or two microelectrodes, and to evaluate the quality of acquired data.

Additional information

EN: Completion methods
Passing the course is based on active participation in laboratory exercises and a written exam. Grading is based on the written exam only. Attending the approximately 50 hours of contact teaching (lectures and

laboratory practicals), plus up to 80 hours of independent studying (depending on prior knowledge) may be needed for achieving an excellent grade.

Assessment practices and criteria

Grading scale 0 – 5. Grading is based on a written exam where the student is supposed to show comprehension of key concepts and principles, as well as ability to explain proper use and sources of error of the different recording techniques.

Activities and methods in support of learning

This is a hands-on laboratory course where students work in small groups under guidance of the teacher.

Target groups

This course is intended primarily for students of the Master's Programme in Neuroscience or other students studying the Electrophysiology and Neurobiophysics -module. The course is also suitable for doctoral students. Maximum number of students: 18.

Teaching period when the course will be offered

This two week course runs annually in spring term (period 3 or 4).

If the number of students attending the course is 10 to 18, the second week will run in two shifts (morning and afternoon shifts) and the detailed schedule of the second week will be planned together with the students.

Recommended time or stage of studies for completion

First year, spring term, in the Master's Programme, or later.

EQF level: 7

Study materials

EN: Lecture handouts and written instructions for laboratory exercises. Additional supporting literature will be made available during the course.

Completion method and assessment items	Recurrence	Credits
Method 1		5 cr
Participation in teaching		5 cr

NEU-543 Brain slice electrophysiology

NEU-543 Aivoleikkeiden sähköfysiologia

NEU-543 Hjärnsnitt elektrofysiologi

Abbreviation: Aivoleikkeiden

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Neuroscience 100%
Responsible person	Svetlana Molchanova, Responsible teacher
Study level	Advanced studies

Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: A strong background in neuroscience is needed, including lectures in neurobiology, molecular neurobiology, book examination in neuroscience etc. For example, course “Cellular Neurobiology” gives theoretical knowledge, needed for the successful accomplishment of the current course. A letter of motivation is required when applying for the course. Motivation letter should include a brief description of theoretical knowledge in neuroscience and explanation why this course is needed for the study track of the student.

Learning outcomes

EN: The main goal is to learn widely used in vitro methods in electrophysiology (field recordings and patch clamp). During the course, students strengthen their theoretical knowledge on the basic electrical behavior of neurons and synaptic transmission and relate their theoretical knowledge to observations of the real experiments. After the course, students will be able to describe mostly used electrophysiological techniques. They will be able to make preparations of the living brain slices in vitro, perform extracellular and intracellular recordings of neuronal electrical activity, analyze the collected data and understand how it relates to scientific principles and evidences published in scientific papers. In addition, practical work in small groups will let students to practice the problem-solving and team work skills.

Content

EN: During the course, several techniques are discussed and applied in practice (field potentials, whole-cell patch-clamp, electrical stimulation of the synaptic inputs). Techniques are applied to demonstrate the main principles of neuronal electrical activity, synaptic transmission and plasticity in real laboratory experiments, using living slices of the rodent brain in vitro. Theoretical course material includes the manual and hand-outs of lectures. In addition, students are encouraged to use the scientific publications during preparation of the report.

Additional information

EN: Target group
1. Students of Master’s Programme in Neuroscience and Doctoral Programme Brain & Mind. 2. Other MSc students and doctoral candidates

Maximum number of participants for the hands-on part of the course: 9. Selection of participants will be based on the study program, previous studies and motivation letter.

Timing

Spring term (period 3-4). The contact teaching consists of 7 full days of laboratory practice (5 days according to the course schedule plus 2 days, with different dates for the groups), and one 2h-session for discussion of prepared course reports.

Assessment practices and criteria

Assessment includes course laboratory work and written report. The report is done according to the template provided at the course. Grading scale: 0-5, based on the evaluation matrix. Participation in at least six of seven hands-on course days and a written report are needed for completion of the course.

Completion

The total amount of work (135h) is divided into contact sessions (80h) and preparation of written reports (55h).

Responsible person

Svetlana Molchanova

EQF level: 7

Study materials

EN: Lecture handouts and written instructions for laboratory exercises.

Completion method and assessment items	Recurrence	Credits
Method 1		5 cr
Participation in teaching		5 cr

NEU-511 Systems and Cognitive Neuroscience

NEU-511 Systeeminen ja kognitiivinen neurotiede

NEU-511 Systemisk och kognitiv neurovetenskap

Abbreviation: Systeeminen ja

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English
Grading scale	Pass-Fail
University	University of Helsinki
Responsible organisation	Master's Programme in Neuroscience 100%
Responsible person	Juha Voipio, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Tweet text

EN: This self-study e-course gives you a comprehensive introduction to the interdisciplinary field of systems and cognitive neuroscience

Prerequisites

EN: Successful studying of the course requires good basic knowledge in at least one of the following fields: neurobiology/neuroscience, psychology, cognitive science, neuroscience related biomedical engineering.

Learning outcomes

EN: The course provides a comprehensive introduction to the interdisciplinary field of systems and cognitive neuroscience and a good basis for further studies in the field. Students learn the rationale of research as well as experimental methods and approaches, concepts and theoretical frameworks that are common in the field. After successful completion of the course, students have gained knowledge and understanding in what follows:

- conceptual and theoretical frameworks of cognitive neuroscience
- cellular functions and neuroanatomy (basics needed to study the course)
- brain imaging and behavioral methods used for studying cognitive functions
- sensory systems processing of sensory information
- how emotions are enabled by the brain and imaged in cognitive research
- executive actions and control of behavior, and the underlying brain mechanisms
- basics of the neurophysiology of sleep
- processing of social information and neural systems involved in social interaction

- neural basis of language functions
- storing and processing information in memory

Content

EN: Course modules cover the following topics:

- What is systems and cognitive neuroscience?
- Principles of neuronal function and neuroanatomy: Neurons and glial cells, chemical and electrical signaling in the brain. Brain anatomy: major brain tracts, functional cortical areas, brain topology.
- Brain imaging methods: MEG, EEG, TMS, fMRI, DTI, NIRS, PET. Behavioral methods: experimental methods, questionnaire methods. Analysis and interpretation of data.
- Sensory systems: vision, hearing, tactile and proprioceptive senses, chemical senses.
- Selective processing of incoming information: attention; disorders of attention.
- Emotions in the brain; and how emotions are studied using neuroimaging methods.
- Storing and processing information in memory: types of memory, neural basis of memory, emotions and memory.
- Executive actions and control of behavior: Deficits in executive functions. Neural systems of reward, decision making, motor control, visual cues and the control of movement.
- Sleep: circadian rhythm, vigilance states, brain processes during sleep.
- Neuronal processes underlying social interaction and cooperation: face perception, social cues, social brain networks. Developmental disorder of social interaction.
- Brain and language. Music.

Additional information

EN:

Target groups

Students of the Master's Programme in Neuroscience, as well as MSc and doctoral students and exchange students who meet the prior knowledge requirements.

Completion methods

After enrolling to this self-study e-course, students gain access to the "Systems and cognitive neuroscience" Moodle site that is divided into modules. You will study materials of each module following the instructions given, and monitor your own learning using quizzes and module-specific tests. Each module forms a unit that is completed before you can continue to the next module. Completion of the whole course is based on the module-specific tests and a final exam.

Assessment practices and criteria

Passing the course and assessment are based on exams incorporated in the Moodle platform of the course and a separate final exam.

Activities and methods in support of learning

The available web-material consists of self-study-materials, including text, illustrations, videos, rehearsals, quizzes, etc.

Teaching period when the course will be offered

This is a self-study e-course, available throughout the year.

Recommended time or stage of studies for completion

Any time after completing the majority of compulsory courses in the Master's Programme in Neuroscience.

Language of instruction

English

EQF level:

7

Study materials

EN: All materials are in Moodle, and consist of various forms of self-study-materials, including text, illustrations, videos, rehearsals, quizzes, etc.

Completion method and assessment items	Recurrence	Credits
Method 1		5 cr
Independent study		5 cr

NEU-561 Principles of bioscience omics

NEU-561 Biotieteellisten omiikkojen perusteet

NEU-561 Grunderna i biovetenskapliga omiker

Abbreviation: Biotieteelliste

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	10 cr
Languages	English
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Neuroscience 100%
Responsible persons	Reijo Käkelä, Responsible teacher Pia R-M Siljander, Responsible teacher Marc Baumann, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Tweet text

EN: Lectures and laboratory demonstrations clarify workflow of different systems scale methods of biochemical analyses, known as omics, and related bioinformatics.

Prerequisites

EN: BSc in any life science field.

Learning outcomes

EN: The students acquire a general view of the workflow of different systems scale methods of biochemical analyses, known collectively as omics, and the related bioinformatics required for data analysis. After the course, students can design omics-based experimentation and are aware of methodological pitfalls. Students will be able to read and interpret multivariate omics data, which allows them to efficiently utilize data produced by different omics core facilities. They will also be able to integrate results from different omics approaches and platforms, e.g., between genome, proteome and metabolome.

Content

EN: During the course the principles of genomics, epigenomics, transcriptomics, proteomics, glycoproteomics, metabolomics and lipidomics are studied to the extent which is needed to read and interpret these omics data. Contemporary methodologies in genomics and transcriptomics are demonstrated. The mass spectrometry approaches presented are targeted mass spectrometric analysis of preselected molecules, compositional analysis of metabolites by non-targeted mass spectrometric profiling and mass spectrometric imaging of tissue compound localization. In addition, data integration across different omics approaches and platforms are demonstrated. Students are familiarized with the most frequently used bioinformatics methods, which are used in the context of the demonstrated omics.

Additional information

EN:

Completion methods

The students need to participate (min 80%) in the obligatory lectures and exercises (70 h), submit all assignments, and pass all the Moodle quizzes. The work required on own time is about 200 h.

Assessment practices and criteria

Grading 0-5 is based on the obligatory assignments. In addition, for each course section (6-7) a Moodle quiz needs to be passed. The points given for each assignment are detailed on the Moodle page of the course.

Target groups

Primarily for master's and doctoral students in any life science field. If in need to limit class size, the students from the organizing programmes and faculties are prioritized. Master's Programme in Neuroscience (responsible; Faculty of Biological and Environmental Sciences) organizes the course in collaboration with the Master's Programme in Translational Medicine (Faculty of Medicine), Master's Programme in Genetics and Molecular Biosciences (the course is obligatory in the study track of Molecular and Analytical Health Biosciences of the programme; Faculty of Biological and Environmental Sciences), and Doctoral Programme in Integrative Life Science

Teaching period when the course will be offered

Periods 3 and 4, annually.

Language of instruction

English

EQF level

7

Study materials

EN: Selected review articles illuminating the principles of omics and related bioinformatics are studied while preparing the graded assignments.

Completion method and assessment items	Recurrence	Credits
Method 1		10 cr
Participation in teaching		10 cr

NEU-603 Laboratory animal science

NEU-603 Koe-eläintiede

NEU-603 Försöksdjursvetenskap

Abbreviation: LAS NEU-603

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	1-5 cr
Languages	English
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Neuroscience 100%
Responsible persons	Mikael Segerstråle, Responsible teacher Eva Ruusuvuori, Responsible teacher
Study level	Advanced studies

Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Tweet text

EN: The course covers the main aspects you need to know when using animals for scientific purposes: from basic theory and handling to advanced design of projects.

Equivalences to other studies

522049 Lectures in Laboratory Animal Science

or

522055 Practical Work in Laboratory Animal Science

or

522085 Laboratory Animal Science: Design of Animal Experiments

Learning outcomes

EN: The aim of the course is to provide theoretical and practical training in laboratory animal science in accordance with the Directive 2010/63/EU and national legislation.
Basic theoretical studies (2 credits)#provide the obligatory theoretical knowledge for persons euthanizing or carrying out procedures on animals and designing procedures and projects involving animals.

Hands-on exercises (1 credit) Students will learn to apply their theoretical knowledge on *e.g.*, handling, marking and sample collection in an actual hands-on situation under supervision.

Advanced#Design Exercises(2 credits) Students obtain in depth knowledge on how to design procedures and projects with an emphasis on animal welfare and on understanding and implementing good scientific practices.

Content

EN: Content
The course content follows the structure outlined in the EU Expert Working Group document (February 2014) on common education and training framework in the EU.

The basic theoretical studies (2 cr)# cover e.g. legislation; ethical aspects; biology and husbandry of laboratory mice and rats; design and conduct of animal experiments; minimally invasive experimental procedures; humane endpoints; and assessment of pain, distress and suffering, anesthesia and surgical procedures. Note that the basic material focuses on rats and mice. If you want to gain competence to work with other animal species, e.g., zebrafish, please contact the responsible teacher Mikael Segerstråle.

The practical hands-on exercises (0,5 - 1 cr)# include training appropriate handling of the common laboratory rodents (mice and rats), and in basic procedures, such as marking animals, blood sampling, injections, induction and maintenance of anesthesia, and humane methods of killing. Responsible teacher Mikael Segerstråle.

The advanced design exercises (2 cr)# cover level II education in implementation of 3Rs when designing procedures and projects; and in the principles of good scientific strategies necessary to achieve robust results; enhance understanding of legal and regulatory framework within which projects are constructed and managed, and of the legal responsibilities of those working with animals; and give training in identifying, understanding and responding appropriately to the ethical and welfare issues raised by the use of animals for scientific purposes. Responsible teacher Eva Ruusuvuori.

Additional information

EN: Completion methods
#To pass Basic theoretical studies (2 cr) students need to 1) acceptably complete the relevant study-material, and 2) pass the final exam. The study-material of Basic theoretical studies must be successfully completed before participating practical hands-on or advanced design exercises.

To pass Hands-on exercises students need to 1) attend practical work sessions (100 % attendance) and 2) demonstrate acquisition of the required skills.

To pass Advanced Design Exercises students need to 1) acceptably complete the relevant study-material , 2) attend contact teaching and group work sessions (100 % attendance), 3) accomplish assignments given during the course; and 4) finalize group work.

Assessment practices and criteria:

Basic theoretical studies (2 credits): Assessment is based on a final exam covering the study material (grading 0-5).

Hands-on exercises (0,5 - 1 credit): Assessment (pass/fail) is based on a separate evaluation matrix.

Advanced Design Exercises (2 credits): Assessment is based on course assignments (grading 0 – 5).

5 credits: Grading scale 0-5, based on the exam on study material and the grade from design exercises; hands-on (pass-fail).

Target group

For those who aim to gain competence to do procedures on animals or to design procedures and projects on animals, the courses are mandatory as explained below. Theoretical studies and design exercises are suitable to all students and university personnel interested in research involving animals and for those who want to continue their professional development.

- The Basic theoretical studies are obligatory for persons carrying out procedures on animals (function A competence), for persons designing procedures and projects involving animals (function B) and killing animals (function D).
- The hands-on exercises are obligatory for persons carrying out procedures on animals and euthanizing them (functions A and D competence) and recommended for those aiming for function B competence (designing procedures and projects involving animals).
- The Advanced design exercises are obligatory for persons who want to become competent to design procedures and projects involving animals (function B competence).

The hand-on exercises are primarily aimed for degree students of the Master's Programme in Neuroscience and of the Doctoral Programme Brain & Mind who aim to carry out procedures on rodents .

Teaching period when the course will be offered

Web-material can be completed year-round and must be successfully finalized before attending hands-on teaching (period 2) or design exercises (period 2).

Teaching language

English

This course can be arranged in a different format and with different assessment method for open university students.

Motivational letter for hands-on exercises

Participants to the hands-on exercises are selected based on their motivational letter explaining why the candidate needs to complete the practical training part.

EQF level: 7

Study materials

EN: After enrolling to the course, students gain access to “LASDigi” study-material. Lecturers may provide additional study material.

Completion method and assessment items	Recurrence	Credits
Method 1		5 cr
Participation in teaching (LAS Online Theory)		2 cr
Participation in teaching (Design)		2 cr
Participation in teaching (Hands-on)		1 cr

NEU-231 Mechanisms of regeneration and aging

NEU-231 Uusiutumisen ja vanhenemisen mekanismit

NEU-231 Regenererandets och åldrandets mekanismer

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Neuroscience 100%
Responsible persons	Ulla Pirvola, Responsible teacher Pekka Katajisto, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Prerequisites

EN: BSc in any life science field.

Learning outcomes

EN: After completion of the study unit, student can explain the key molecular, cellular and tissue-level mechanisms known to be involved in regeneration and aging. Student can explain evolutionary perspectives of regeneration and aging. Student can critically evaluate the current and future possibilities to manipulate the regeneration and aging processes. This provides deep understanding of the functional systems level differences that occur between different organisms and during the life span of an organism.

Content

EN: During the first half of the course (1) regeneration mechanisms based on stem cells and functional cell types are explained. The differences in regeneration capacity between animals of different phyla and different ages are addressed as well as the nature of the regeneration barriers of many mammalian cell types. Differences between regeneration and repair are explained. Invertebrate model organisms as well as vertebrate muscle, heart, central nervous system and sensory organs are dealt with. It is discussed whether this knowledge could be brought into therapeutic interventions. The latter half of the course addresses (2) the mechanistic reasons of aging that eventually reduce tissue function and result in frailty, aging associated diseases, and death. Mechanistic insight is provided to understand how the rate of aging can be influenced and why different organisms age very differently. The multiple types of age-associated alterations and their counteracting repair mechanisms will be detailed to address how levels of tissue renewal by tissue specific stem cells and damage accumulation influence aging. Current methods in regeneration and aging research are illuminated.

Additional information

EN:

Target group

Open to students in the Neuroscience Master's Programme and in other master degree programmes (molecular biosciences, biology, medicine). If in need to limit class size, students from the organizing master's programmes and faculty are prioritized.

Timing

Period 4 / The course is taught annually

Assessment practices and criteria

Grading (0-5) is based on written assignments that are individually graded, on the oral presentation of each student in the final symposium of the course, and on general activity during sessions.

Completion methods

Participation in teaching (lectures, group work, assignments, presentation). The course includes compulsory face-to-face meetings and cannot be completed entirely by distance learning. Minimum of 80 % participation in sessions.

Responsible person

Ulla Pirvola, Pekka Katajisto

EQF level 7

Study materials

EN: Lecture material and other material assigned to the course in Moodle. Selected articles illuminating the mechanisms of regeneration and aging are studied while preparing the assignments and presentation.

Completion method and assessment items	Recurrence	Credits
Method 1		5 cr
Participation in teaching		5 cr

TMED-406 Translational Psychiatry

TMED-406 Translational Psychiatry

TMED-406 Translational Psychiatry

Abbreviation: Translational P

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Translational Medicine 100%
Responsible person	Henna-Kaisa Wigren, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Medical science

Equivalences to other studies

TMED-403 Psychobiology of Stress

or

TMED-405 Corticolimbic Regulatory Systems in Health and Disease

Learning outcomes

FI: After completion of the course, the student

- can describe the components and function of the neural systems underlying emotional and motivational states
- can explain how these systems are perturbed in psychiatric disorders
- can identify the key molecular players contributing to perturbed brain function
- knows the basic experimental models used for studying psychiatric disorders resulting from dysfunctional regulatory systems
- has knowledge on the basis of pharmacological therapies for disorders discussed during the course

SV: After completion of the course, the student

- can describe the components and function of the neural systems underlying emotional and motivational states
- can explain how these systems are perturbed in psychiatric disorders
- can identify the key molecular players contributing to perturbed brain function
- knows the basic experimental models used for studying psychiatric disorders resulting from dysfunctional regulatory systems
- has knowledge on the basis of pharmacological therapies for disorders discussed during the course

EN: After completion of the course, the student

- can describe the components and function of the neural systems underlying emotional and motivational states
- can explain how these systems are perturbed in psychiatric disorders
- can identify the key molecular players contributing to perturbed brain function
- knows the basic experimental models used for studying psychiatric disorders resulting from dysfunctional regulatory systems
- has knowledge on the basis of pharmacological therapies for disorders discussed during the course

Content

FI: Psychiatric disorders are thought to arise from dysregulation of neural systems underlying arousal, motivation, emotion and cognition. The aim of the course is to delineate the neuroanatomy and functions of these systems in the healthy and diseased brain. In addition, the molecular and neurochemical perturbations associated with these disorders will be covered. The course will highlight the contribution of various experimental models for understanding the disease processes in the human brain. The course also provides a framework for the current and emerging therapies for psychiatric disorders.

SV: Psychiatric disorders are thought to arise from dysregulation of neural systems underlying arousal, motivation, emotion and cognition. The aim of the course is to delineate the neuroanatomy and functions of these systems in the healthy and diseased brain. In addition, the molecular and neurochemical perturbations associated with these disorders will be covered. The course will highlight the contribution of various experimental models for understanding the disease processes in the human brain. The course also provides a framework for the current and emerging therapies for psychiatric disorders.

EN: Psychiatric disorders are thought to arise from dysregulation of neural systems underlying arousal, motivation, emotion and cognition. The aim of the course is to delineate the neuroanatomy and functions of these systems in the healthy and diseased brain. In addition, the molecular and neurochemical perturbations associated with these disorders will be covered. The course will highlight the contribution of various experimental models for understanding the disease processes in the human brain. The course also provides a framework for the current and emerging therapies for psychiatric disorders.

Additional information

FI: Target group
Students of the Master's Programme in Translational Medicine, compulsory in study track Neuroscience and Psychobiology. Master's Programme in Neuroscience and other Master's and doctoral students.

Completion methods

For completion, 80% attendance in contact teaching, completion of the oral and written assignments, and passing the exam are required.

Activities and teaching methods in support of learning

The student participates in group work, has the chance to give an oral presentation and receive feedback on presentation skills, conducts literature searches and reads scientific articles, and writes an essay.

Assessment practices and criteria

Assignments, group work and examination. Course grading (scale 0-5) is based on the examination (33%), group work (33%) and the written essay (33%).

Relations to other study units

Belongs to study unit Mechanisms of Human Disease in all study tracks of the Master's Programme in Translational Medicine.

Responsible teacher

University lecturer Henna-Kaisa Wigrén#

SV: Target group
Students of the Master's Programme in Translational Medicine, compulsory in study track Neuroscience and Psychobiology. Master's Programme in Neuroscience and other Master's and doctoral students.

Completion methods

For completion, 80% attendance in contact teaching, completion of the oral and written assignments, and passing the exam are required.

Activities and teaching methods in support of learning

The student participates in group work, has the chance to give an oral presentation and receive feedback on presentation skills, conducts literature searches and reads scientific articles, and writes an essay.

Assessment practices and criteria

Assignments, group work and examination. Course grading (scale 0-5) is based on the examination (33%), group work (33%) and the written essay (33%).

Relations to other study units

Belongs to study unit Mechanisms of Human Disease in all study tracks of the Master's Programme in Translational Medicine.

Responsible teacher

University lecturer Henna-Kaisa Wigrén

EN: Target group
Students of the Master's Programme in Translational Medicine, compulsory in study track Neuroscience and Psychobiology. Master's Programme in Neuroscience and other Master's and doctoral students.

Completion methods

For completion, 80% attendance in contact teaching, completion of the oral and written assignments, and passing the exam are required.

Activities and teaching methods in support of learning

The student participates in group work, has the chance to give an oral presentation and receive feedback on presentation skills, conducts literature searches and reads scientific articles, and writes an essay.

Assessment practices and criteria

Assignments, group work and examination. Course grading (scale 0-5) is based on the examination (33%), group work (33%) and the written essay (33%).

Relations to other study units

Belongs to study unit Mechanisms of Human Disease in all study tracks of the Master's Programme in Translational Medicine.

Responsible teacher

University lecturer Henna-Kaisa Wigrén#

Study materials

FI: The literature required for completion of the course consists of a selection of scientific articles related to the lecture topics, given at the outset of the course. The students will also search for relevant literature for their presentations during the course.

SV: The literature required for completion of the course consists of a selection of scientific articles related to the lecture topics, given at the outset of the course. The students will also search for relevant literature for their presentations during the course.

EN: The literature required for completion of the course consists of a selection of scientific articles related to the lecture topics, given at the outset of the course. The students will also search for relevant literature for their presentations during the course.

Completion method and assessment items	Recurrence	Credits
Method 1		5 cr
Participation in teaching		5 cr

MED-TOU11 An Introduction to Sleep and Circadian Neurobiology

MED-TOU11 An Introduction to Sleep and Circadian Neurobiology

MED-TOU11 An Introduction to Sleep and Circadian Neurobiology

Abbreviation: An Introduction

Curriculum period	2023-24
Validity period	since 1 Aug 2023
Credits	2.5 cr
Languages	English
Grading scale	Pass-Fail
University	University of Helsinki
Responsible organisation	Degree Programme in Medicine 100%
Responsible person	Henna-Kaisa Wigren, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Medical science

Prerequisites

FI: Knowledge on basics of neuroscience and physiology will help with studies.

EN: Knowledge on basics of neuroscience and physiology will help with studies.

Equivalences to other studies

MED-824 An Introduction to Sleep and Circadian Neurobiology

Learning outcomes

FI: The students will:
× Understand the basic principles of sleep and circadian neurobiology, and the impact of sleep/insufficient sleep to health and well-being.

× The students will:

× -understand the basic principles of sleep and circadian neurobiology, and the impact of sleep/insufficient sleep to health and well-being.

× -be familiar with the most commonly used experimental approaches in sleep research (EEG, behavioral tracking, imaging, molecular genetics, epidemiology etc.).

× -be able to apply the understanding of sleep and circadian neurobiology to other fields of neuroscience and critically judge new findings.

× -be better equipped to take sleep and circadian aspects into consideration in their own work.

EN: The students will:
× Understand the basic principles of sleep and circadian neurobiology, and the impact of sleep/insufficient sleep to health and well-being.

× The students will:

× -understand the basic principles of sleep and circadian neurobiology, and the impact of sleep/insufficient sleep to health and well-being.

× -be familiar with the most commonly used experimental approaches in sleep research (EEG, behavioral tracking, imaging, molecular genetics, epidemiology etc.).

× -be able to apply the understanding of sleep and circadian neurobiology to other fields of neuroscience and critically judge new findings.

× -be better equipped to take sleep and circadian aspects into consideration in their own work.

Additional information

FI:

Kohderyhmä

LL 3-6/HLL 3-6, Psychology, Transmed and Neuroscience students

LL opiskelijat: Toukokuun syventäviin rinnastettava opintojakso

Ajoitus

Can be completed at any time of the year

Toteutus

Videos 15 h

Video problems 10 h

Examination 1 h

Literature studies 20 h

Stuies on teh materia and preparation for examination 15+6 = 21 h

Altogether 67 h

Sisältö

This is a web-based course consisting of 20 videos á 20 min on different aspects of sleep. Each video has section of 10 multiple choice questions and 2-4 articles as part of the educational content.

Titles of the videos

Definition and structure of sleep

Introduction to measurement of sleep

Neuroanatomy and-chemistry of sleep

Basics of circadian rhythms

Sleep regulation and the 2-process model

REM sleep

Theories on function of sleep

Effects of pharmacological agents on sleep

Adaptation of bodily functions to sleep

Effects of acute and chronic sleep deprivation

Sleep, learning and memory

Genetics of sleep regulation

Hormone secretion and sleep

Thermoregulation and sleep

Sleep at different ages

Gender differences in sleep

Sleep and mental health

Sleep and dreaming

Sleep and consciousness

Jet lag and shift work

Arviointimenetelmät ja -kriteerit

All tests related to videos and the final examination must be accepted (50% acceptance rate) before course acceptance. Final examination can be participated only after acceptance of the tests related to the videos. Course will be rates as accepted/not accepted.

Suoritustavat

Video course (altogether 20 videos) on Moodle platform. Each video connects to a set of questions that the student must complete before participating the final examination and acceptance of the course. Course will end with an examination at Examinarium.

Lisätiedot

The course language is English.

Vastuuhenkilö Henna-Kaisa Wigren, henna-kaisa.wigren@helsinki.fi, Research program unit

EQF-taso

ylempi korkeakoulututkinto / EQF-taso 7

EN:

Target group

LL/HLL, Psychology, Transmed and Neuroscience students

Timing

Can be completed at any time of the year

Completion methods

Videos 15 h

Video problems 10 h

Examination 1 h

Literature studies 20 h

Stuies on teh materia and preparation for examination 15+6 = 21 h

Altogether 67 h

Contents

This is a web-based course consisting of 20 videos á 20 min on different aspects of sleep. Each video has section of 10 multiple choice questions and 2-4 articles as part of the educational content.

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Definition and structure of sleep

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Basics of circadian rhythms

Sleep regulation and the 2-process model

REM sleep

Theories on function of sleep

Effects of pharmacological agents on sleep

Adaptation of bodily functions to sleep

Effects of acute and chronic sleep deprivation

Sleep, learning and memory

Genetics of sleep regulation

Hormone secretion and sleep

Thermoregulation and sleep

Sleep at different ages

Gender differences in sleep

Sleep and mental health

Sleep and dreaming

Sleep and consciousness

Jet lag and shift work

Assessment practices and criteria

All tests related to videos and the final examination must be accepted (50% acceptance rate) before course acceptance. Final examination can be participated only after acceptance of the tests related to the videos. Course will be rates as accepted/not accepted.

Completion

Video course (altogether 20 videos) on Moodle platform. Each video connects to a set of questions that the student must complete before participating the final examination and acceptance of the course. Course will end with an examination at Examinarium.

Other information

The course language is English.

Responsible person Henna-Kaisa Wigren, henna-kaisa.wigren@helsinki.fi, Research program unit

Study materials

FI: 1-4 scientific articles per video announced at the Moodle site after each video.

EN: 1-4 scientific articles per video announced at the Moodle site after each video.

Completion method and assessment items	Recurrence	Credits
Method 1		2.5 cr
Participation in teaching		2.5 cr
Method 2		2.5 cr
Exam		2.5 cr
Method 3		2.5 cr
Independent study		2.5 cr

MED-TOU25 Interdisciplinary insights into sleep and circadian rhythms

MED-TOU25 Monitieteellinen jatkokurssi unesta ja vuorokausirytmeistä

MED-TOU25 Interdisciplinär kurs on sömn och dygnsrytmer

Abbreviation: Monitieteelline

Curriculum period	2023-24
Validity period	since 1 Aug 2023
Credits	2.5 cr
Languages	English
Grading scale	Pass-Fail
University	University of Helsinki
Responsible organisation	Degree Programme in Medicine 100%

Responsible persons	Tiina Härkönen, Responsible teacher Titta Vilanti, Administrative person Henna-Kaisa Wigren, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Medical science

Prerequisites

FI: Course MED-TOU11, “An Introduction to Sleep and Circadian Neurobiology web course” accepted

Learning outcomes

FI: The students will:
- Understand the principles of sleep and circadian neurobiology, and the impact of sleep/insufficient sleep to health and well-being
-will understand the interdisciplinary nature of sleep, both as research topic and as clinical problem
-be familiar with the commonly used experimental approaches in sleep research (EEG, behavioral tracking, imaging, molecular genetics, epidemiology etc.) and is able to critically evaluate the selection of the equipment for specific purposes
-be able to apply the understanding of sleep and circadian neurobiology to other fields of neuroscience and critically judge new findings.
-be able to take sleep and circadian aspects into consideration in their professional performance
-be familiar with common clinical problems of sleep and their treatment

Additional information

FI:

Kohderyhmä

Medicine, Dentistry, Psychology, Logopedics, Translational Medicine and Neuroscience students who have accomplished the course “An Introduction to Sleep and Circadian Neurobiology” (33 medical faculty, 7 neuroscience)

The course takes place if the number of participants is at least 12 persons

LL opiskelijat: Toukokuun syventävä opintojakso

Ajoitus

Kevätlukukausi

Toteutus

Opetusmenetelmät:

Video problems 3 h
In-depth lectures 6 h
Small group work 10 h
Hands-on 3h
Literature studies 20 h
Studies on the material and preparation for examination 24 h
Examination 2 h

Altogether 68 h
Opetukseen osallistuminen (100, 90 tai 75 %): 90%

Sisältö

The course will consist of lectures by specialists on different topics of sleep- and circadian rhythm-related topics, including clinical and circadian topics, altogether 6 hours. The participants will collect data on their circadian rhythms and sleep using actigraphs and polysomnography, learning the details of data collection and analysis. They will also learn about the methods to assess sleep and circadian rhythms in different species. The participants will prepare in small groups a presentation for the final seminar of the course.

Oppimista tukevat aktiviteetit ja opetusmenetelmät

N/A

Arviointimenetelmät ja -kriteerit

Course will be evaluated as accepted/not accepted.

Lisätiedot

Opetuskieli: English
Opetuksen vastuuhenkilö: Henna-Kaisa Wigren, henna-kaisa.wigren@helsinki.fi, Research Programs Unit, SleepWell program
Opintojakson yhdyshenkilö: Tiina Härkönen, project coordinator, tiina.harkonen@helsinki.fi, Research Programs Unit, SleepWell program

EQF-taso

ylempi korkeakoulututkinto / EQF-taso 7

Completion method and assessment items	Recurrence	Credits
Method 1		2.5 cr
Participation in teaching		2.5 cr
Method 2		2.5 cr
Exam		2.5 cr
Method 3		2.5 cr
Independent study		2.5 cr

DATA20047 Probabilistic Cognitive Modelling

DATA20047 Probabilistic Cognitive Modelling
DATA20047 Probabilistic Cognitive Modelling

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English, Finnish, Swedish
Grading scale	General scale, 0-5
University	University of Helsinki
Responsible organisation	Master's Programme in Data Science 100%
Responsible person	Luigi Acerbi, Responsible teacher
Study level	Advanced studies
Study field	Fields of education (Ministry of Education and Culture), Information and Communication Technologies (ICTs)

Tweet text

FI: Learn about - and how to build in practice - Bayesian models of perception and action

SV: Learn about - and how to build in practice - Bayesian models of perception and action

EN: Learn about - and how to build in practice - Bayesian models of perception and action

Prerequisites

FI: University-level first-year mathematics (e.g., calculus, linear algebra); introduction to probability calculus or similar courses; statistical inference; programming skills in Python.

Prerequisites for students in the Data Science programme

Introduction to Machine Learning, Data Analysis with Python (or equivalent course).

Prerequisites for other students

A course which tests programming skills in Python, in addition to the mathematics above, such as Data Analysis with Python.

Recommended preceding courses

It is highly recommended to have taken at least one course in Bayesian inference (for example MAT22005 Bayes-päättely; MAST32001 Computational Statistics; DATA11006 Statistical Data Science; or LSI35002 Bayesian inference in biosciences, or similar).

In particular, Computational Statistics (MAST32001) ensures that you would meet (and exceed) all the prerequisites for the course.

Recommended optional studies

This course pairs well with other courses in the area of neuroscience and/or cognition, such as Cognitive Modelling Concepts (LDA-C302), Introduction to the Philosophy of Mind and Artificial Intelligence (LDA-C504) and Cognition & Brain Function (LDA-C506), or similar others. However, no prior knowledge of cognitive science or neuroscience is required for taking this course.

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Learning outcomes

FI: After the course, the student will understand the basics of how brain function, and in particular perception and simple cognition and decision making can be modelled and described via probabilistic (Bayesian) modelling.
In particular:

1. Describe the Bayesian approach to perception and action;
2. Read and understand Bayesian models from the cognitive science literature;
3. Implement Bayesian observer and actor models for simple tasks;
4. Apply numerical and statistical methods for fitting these models to data;
5. Develop (new) models to explain human behavior and real data.

More generally, the course will support the development of research and academic skills related to systemic thinking and modelling of complex systems, testing hypotheses via computational modelling and applying good practices in applied research.

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5. Develop (new) models to explain human behavior and real data.

More generally, the course will support the development of research and academic skills related to systemic thinking and modelling of complex systems, testing hypotheses via computational modelling and applying good practices in applied research.

Content

FI: The course focuses on how probabilistic (Bayesian) modelling provides a general framework to understand and explain a variety of phenomena in cognition, perception and action - a framework known as "the Bayesian brain". The key concept is to model the brain as performing statistical inference.
This course focuses on both the mathematical theory and practical numerical modelling and programming. Thus, besides Bayesian modeling of various aspects of cognition, the course will cover numerical and statistical techniques for model building and model fitting applied to probabilistic cognitive modeling.

Topics covered include:

- Introduction to probabilistic (Bayesian) observer modelling;
- Recap of probability and numerical methods;
- How to model noisy perception as inference;
- Predicting behavior from observer models;
- Fitting Bayesian observer (and other) models to data;
- Applications of Bayesian observer models to concrete examples and case studies, such as: cue combination, learning, motor control, "causal inference" in multisensory perception (the specific applications being covered may change depending on the year).

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Additional information

FI:

Completion methods

The course will consist of reading material, lectures and Q&A sessions with the instructors, workshops with programming sessions, and homework. Attendance is not required but recommended.

Course completion will be by sets of homework problems throughout the course and assignments submitted online.

The course completion methods are compatible with open university learning.

Assessment practices and criteria

Assessment will be based on sets of homework assignments throughout the course. Grading scale 0-5.

Activities and teaching methods in support of learning

Students will be given material to read in advance, usually in the form of chapters from textbooks. During the weekly sessions, the instructor will cover and discuss the material with a lecture and with questions-and-answers. Sessions will include coding workshops to practice the learnt material on some problems. The homework assignments will be mainly coding problems.

Target groups

The Master's programme in Data Science is responsible for the course.

The course is available to students from other degree programmes.

Teaching period when the course will be offered

The course will be offered in the Spring term, typically in period III unless stated otherwise.

Recommended time or stage of studies for completion

1st or 2nd year of Master's degree.

Study module

The course belongs to the Cognition in Brain and Machines module.

Expiry of studies

N/A.

Language of instruction

English.

SV:

Completion methods

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Expiry of studies

N/A.

Language of instruction

English.

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Recommended time or stage of studies for completion

1st or 2nd year of Master's degree.

Study module

The course belongs to the Cognition in Brain and Machines module.

Expiry of studies

N/A.

Language of instruction

English.

Study materials

FI: The course will use publicly available textbooks, complemented as needed with slides and lecture notes, plus Python notebooks for the coding parts. All study materials will be made available in the course Moodle area.

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Literature

Ma, Kording & Goldreich, "Bayesian models of perception and action", MIT Press 2022.

Completion method and assessment items	Recurrence	Credits
Method 1		5 cr
Participation in teaching		5 cr

DPBM-148 In Vivo Animal Imaging: Methods and Applications

DPBM-148 In Vivo Animal Imaging: Methods and Applications

DPBM-148 In Vivo Animal Imaging: Methods and Applications

Abbreviation: In Vivo Animal

Curriculum period	2023-24
Validity period	since 1 Aug 2023
Credits	1-2 cr
Languages	English
Grading scale	Pass-Fail
University	University of Helsinki
Responsible organisation	Doctoral Programme in Biomedicine 100%
Responsible person	⚠ [information missing], Responsible teacher
Study level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Medical science

Learning outcomes

FI: The aim is to open up the field of in vivo animal imaging and its use in non/pre-clinical applications. The course is useful for students who might benefit from using in vivo animal imaging for their own research.
The course will cover a range of current methods for in vivo animal imaging, with an emphasis on those that are available for scientists within HiLife/UH, and focusing on recent and8scientifically exciting applications.

SV: The aim is to open up the field of in vivo animal imaging and its use in non/pre-clinical applications. The course is useful for students who might benefit from using in vivo animal imaging for their own research.
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The course will cover a range of current methods for in vivo animal imaging, with an emphasis on those that are available for scientists within HiLife/UH, and focusing on recent and8scientifically exciting applications.

Additional information

FI:

Kohderyhmä

· Compulsory/optional course: optional

· The Doctoral Programme in Biomedicine coordinates the course

· The course is part of the discipline-specific Studies module

· The course is available to students of other degree programmes

Ajoitus

Spring or Autumn term

Toteutus

One-day open minisymposium with lectures + a choice of 2-3 demos during two days.

Sisältö

Methods will include intravital microscopy applications and optical small animal imaging, SPECT/microCT and other methods that are widely used in cancer research, neuroimaging, vascular biology, target validation and drug bio-distribution studies. While some of the methods are especially used for small rodents, optical and behavioral in vivo imaging are suitable also for zebrafish.

The demos may include in vivo multiphoton imaging of mice (neural imaging through cranial window, dermal vasculature) and behavioral imaging of zebrafish, and SPECT/CT (real-time imaging of radiolabeled substances).

Oppimista tukevat aktiviteetit ja opetusmenetelmät

Exam or homeworks, reading, a written assignment.

Arviointimenetelmät ja -kriteerit

pass/fail, attendance required

Leaving feedback is required

Lisätiedot

Vastuuhenkilö

Pipsa Saharinen

SV:

Målgrupp

· Compulsory/optional course: optional

· The Doctoral Programme in Biomedicine coordinates the course

· The course is part of the discipline-specific Studies module

· The course is available to students of other degree programmes

Timing

Spring or Autumn term

Studieavsnittets form

One-day open minisymposium with lectures + a choice of 2-3 demos during two days.

Innehåll

Methods will include intravital microscopy applications and optical small animal imaging, SPECT/microCT and other methods that are widely used in cancer research, neuroimaging, vascular biology, target validation and drug bio-distribution studies. While some of the methods are especially used for small rodents, optical and behavioral in vivo imaging are suitable also for zebrafish.

The demos may include in vivo multiphoton imaging of mice (neural imaging through cranial window, dermal vasculature) and behavioral imaging of zebrafish, and SPECT/CT (real-time imaging of radiolabeled substances).

Aktiviteter och undervisningsmetoder som stöder lärandet

Exam or homeworks, reading, a written assignment.

Bedömningsmetoder och kriterier

pass/fail, attendance required

Leaving feedback is required

Övrig information

Ansvarig person

Pipsa Saharinen

EN:

Target group

· Compulsory/optional course: optional

· The Doctoral Programme in Biomedicine coordinates the course

· The course is part of the discipline-specific Studies module

· The course is available to students of other degree programmes

Timing

Spring or Autumn term

Completion methods

One-day open minisymposium with lectures + a choice of 2-3 demos during two days.

Contents

Methods will include intravital microscopy applications and optical small animal imaging, SPECT/microCT and other methods that are widely used in cancer research, neuroimaging, vascular biology, target validation and drug bio-distribution studies. While some of the methods are especially used for small rodents, optical and behavioral in vivo imaging are suitable also for zebrafish.

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Activities and teaching methods in support of learning

Exam or homeworks, reading, a written assignment.

Assessment practices and criteria

pass/fail, attendance required

Leaving feedback is required

Other information

Responsible person

Pipsa Saharinen

Completion method and assessment items	Recurrence	Credits
Method 1		1 cr
Participation in teaching (min)		1 cr
Method 2		2 cr
Participation in teaching (max)		2 cr
Method 3		1 cr
Exam (min)		1 cr
Method 4		2 cr
Exam (max)		2 cr
Method 5		1 cr
Independent study (min)		1 cr
Method 6		2 cr
Independent study (max)		2 cr

HUB-011 Book exam 1: Cognitive neuroscience

HUB-011 Book exam 1: Cognitive neuroscience

HUB-011 Book exam 1: Cognitive neuroscience

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5-10 cr
Languages	English, Finnish, Swedish

Grading scale	Pass-Fail
University	University of Helsinki
Responsible organisation	Doctoral Programme in Human Behaviour 100%
Responsible persons	Kimmo Alho, Responsible teacher Teppo Särkämö, Responsible teacher
Study level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Medical science

Learning outcomes

FI: Studying for this book examination gives the student an up-to-date big picture of research findings and theories in cognitive neuroscience.

Content

FI: The 10 ECTS exam covers the entire book and the 5 ECTS exam covers Parts VII–XIII (chapters 48–97) of the book. Parts I–VI contain up-to-date advanced knowledge on brain development and brain mechanisms of perception, memory, attention, intention, action, as well as topics in computational cognitive neuroscience. Parts VII–XIII contain advanced knowledge on reward, decision-making, linguistic, and conceptualization systems of the brain, as well as chapters on methodological advances in cognitive neuroscience, social neuroscience, and the role of neuroscience in the society.

Additional information

FI: The three-hour exam with four selected essay questions will be organized in Examinarium, the electronic examination room system, where students can take exams at times suitable for them.
Passing requires an acceptable answer to each question. An acceptable answer needs to indicate that the student has studied the book examined here and that they can combine information from different chapters of the book when appropriate.

Study materials

FI: The book to be studied for this exam is Poeppel, Mangun & Gazzaniga (eds.), The Cognitive Neurosciences, 6th ed., MIT press, 2020. An electronic copy is accessible from University of Helsinki IP addresses at http://cognet.mit.edu/erefs/cognitive-neurosciences-6th-edition

Literature

http://cognet.mit.edu/erefs/cognitive-neurosciences-6th-edition

Completion method and assessment items	Recurrence	Credits
Method 1		5 cr
Exam		5 cr
Method 2		10 cr
Exam		10 cr

HUB-111 Clinical and cognitive human brain research

HUB-111 Clinical and cognitive human brain research

HUB-111 Clinical and cognitive human brain research

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English
Grading scale	Pass-Fail

University	University of Helsinki
Responsible organisation	Doctoral Programme in Human Behaviour 100%
Responsible persons	Teppo Särkämö, Responsible teacher Juha Salmitaival, Responsible teacher Aleksi Sihvonen, Responsible teacher Katri Wegelius, Administrative person
Study level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Medical science

Learning outcomes

FI: In this course, participants will acquire theoretical knowledge on the neural mechanisms of cognitive and emotional deficits associated with common neurodevelopmental, psychiatric and neurological/neurodegenerative disorders across the life span as well as methodological knowledge on modern behavioral and neuroimaging tools used in clinical and cognitive neuroscience research.

Content

FI: This course gives an overview of the current state-of-the-art in clinical and cognitive neuroscience, both from a theoretical and methodological standpoint. Through thematic expert lectures, participants will learn about recent advanced in uncovering the structural and functional neural mechanisms of cognitive and emotional deficits in neurodevelopmental (e.g., autism, attention deficits, dyslexia), psychiatric (e.g., schizophrenia) and neurological / neurodegenerative (e.g. stroke, Alzheimer's disease, Parkinson's disease) disorders. The lectures will also feature methodological parts focusing on the practical implementation of advanced behavioral and neuroimaging analysis tools commonly used in cognitive neuroscience research in clinical populations, including e.g., lesion mapping, morphometry, tractography, and connectivity. The course is aimed at advanced master's students and doctoral students interested in clinical cognitive neuroscience; no previous research experience in the area is required, but basic knowledge on cognitive neuroscience and clinical disorders is recommended.

Additional information

FI: Timing: The course can be completed at the end of master's studies or at any stage of doctoral studies. The course is organized every two years.
Completion methods: Lecture series (hybrid) with expert/guest speakers, attendance required. Course assignment: writing a scientific essay on self-selected lecture topic.

Activities and teaching methods in support of learning: lectures and course assignment.

Assessment practices and criteria: Pass or fail. Attendance and finishing the assignment are required to earn credits.

Completion method and assessment items	Recurrence	Credits
Method 1		5 cr
Participation in teaching		5 cr

HUB-114 Functioning of sensory systems: Visual neuroscience

HUB-114 Aistijärjestelmien toiminta: näkemisen neurotiede

HUB-114 Sinnessystemens funktion: visuell neurovetenskap

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	5 cr
Languages	English
Grading scale	General scale, 0-5

University	University of Helsinki
Responsible organisation	Doctoral Programme in Human Behaviour 100%
Responsible persons	Ilmari Kurki, Responsible teacher Katri Wegelius, Administrative person
Study level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Medical science

Prerequisites

FI: Basic studies in cognitive neuroscience, cognitive psychology and/or perception

Learning outcomes

FI: By completing the course, the student gets basic understanding of brain and cognitive mechanisms of visual perception and gets a good overview of modern research methods. Student is able to describe some of the main findings in the field and explain the principles of neurophysiological, brain imaging and psychophysical methodologies when studying visual perception.

Content

FI: Vision is one of the most studied and best understood disciplines in neuroscience. This course gives an introduction to current research methods and knowledge in visual neuroscience. The lecturers are active researchers that use behavioral/psychophysical, modelling, brain imaging and neurophysiological methods. Each give one lecture on their own specialty topic (such as low-level processing, visual working memory or cortical functional specification) with an emphasis on explaining research methods. The course will give a comprehensive view of visual information processing stages in the brain and shows how various research methods can be used complementary to investigate visual perception.

Additional information

FI: Target group: The course is available to DPHuB students (and a quota of 6 available for students of Doctoral Programme Brain & Mind and Master's Programme in Neuroscience)
Timing: The course can be completed at any stage of studies. Organized in period IV, every second year

Completion methods: The seminar consists of seven weekly face-to-face meetings, where participation is compulsory. Students are expected to read an article or book chapter for each meeting and take part in a quiz before each meeting. Students also prepare a short research paper in small groups

Activities and teaching methods in support of learning: Attending to lectures, answering to quiz questions weekly and writing the research paper

Equivalencies with other studies: PSYK-421 Functioning of sensory systems and in Aalto University NBE-E4530 Visual neuroscience.

Study materials and literature: Lectures and compulsory reading of book chapters and/or articles for each lecture

Assessment practices and criteria: 0 – 5 Evaluation is based on quiz answers (50%), and quality of research paper (50%)

Responsible person: Ilmari Kurki (University of Helsinki), Linda Henriksson (Aalto University)

Completion method and assessment items	Recurrence	Credits
Method 1		5 cr
Participation in teaching		5 cr

HUB-121 MEG/EEG source modelling: from principles to practice

HUB-121 MEG/EEG source modelling: from principles to practice

HUB-121 MEG/EEG source modelling: from principles to practice

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	2 cr
Languages	English, Finnish, Swedish
Grading scale	Pass-Fail
University	University of Helsinki
Responsible organisation	Doctoral Programme in Human Behaviour 100%
Responsible persons	Teija Kujala, Responsible teacher Katri Wegelius, Administrative person
Study level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Medical science

Prerequisites

FI: Participants are assumed to have some knowledge of EEG and/or MEG, or some other neuroimaging technique, but it is not a strict prerequisite for the course. Previous knowledge of python is not required.

Learning outcomes

FI: The course participant understands the basics of MEG and EEG source modelling and can do source modelling. The participant is able to select a suitable source modeling technique for their own experiment.

Content

FI: The course gives an introduction to how MEG and EEG signals are generated, and how source modeling can be used to infer the underlying neural activity. Different source modeling techniques and their application to evoked responses and oscillatory activity are introduced. The course gives a full overview of the analysis steps needed to perform source modeling on MEG data, from pre-processing the raw data to statistical modelling of source level data. Each step of the analysis is accompanied by hands-on exercises. The exercises are implemented in MNE python, but the general principles can be adapted to any analysis software.

Additional information

FI: Target groups
The primary target groups are DPHuB PhD students and researchers affiliated to CoBra HiLIFE platform - CBRU, BioMag, BABA center

Completion methods

Participation in teaching, hands-on analysis, and a short written report.

Assessment practices and criteria

Participation in teaching and hands-on sessions and an acceptable written report

Activities and methods in support of learning

Lectures provide a theoretical background and hands-on analyses sessions support the skills to conduct the actual source-modeling analyses

Literature and learning material

Lecture slides, hands-on script examples, and tutorials from the MNE python website

Responsible organisations

Doctoral Programme in Human Behaviour, CoBra HiLIFE platform, Aalto University (for students of Aalto)

Responsible persons

Teija Kujala, Mia Liljeström (mia.liljestrom@hus.fi)

Completion method and assessment items	Recurrence	Credits
Method 1		2 cr
Participation in teaching		2 cr

NEUBM-102 B&M Symposium 2

NEUBM-102 B&M Symposium 2

NEUBM-102 B&M Symposium 2

Abbreviation: B&M Symposium 2

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	1-2 cr
Languages	English, Finnish
Grading scale	Pass-Fail
University	University of Helsinki
Responsible organisation	Doctoral Programme Brain and Mind 100%
Responsible persons	Katri Wegelius, Responsible teacher Katri Wegelius, Administrative person
Study level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Learning outcomes

EN: The B&M Symposium creates a forum for researchers from different fields of neuroscience to meet, present their data and advance scientific discussion between doctoral candidates and senior researchers. Participants will gain in-depth knowledge from the symposium topics. In addition, they will learn presentation skills and have a possibility for networking with other researchers within the field.

Content

EN: International interdisciplinary symposium on neuroscience including talks from international experts, panel discussion and oral/poster presentations by doctoral candidates.

Additional information

EN: Target group
Annual participation in the B&M symposia is recommended for B&M doctoral candidates. Participation in one B&M symposium with poster/oral presentation (NEUBM-101) is obligatory.

Timing

Organized annually during the fall term.

Completion methods

Symposium lectures by international experts and alumni. Workshops and/or panel discussion on varying topics. Poster or snapshot session(s) with presentations by doctoral candidates.

Participation (minimum of 80%) in the symposium sessions and writing a learning diary for the lectures. 1 credit, and poster/oral presentation: 1 cr.

Assessment practices and criteria

Scale is pass/fail. Participation may be monitored by an attendance list or a learning diary.

The annual B&M symposium is organised by the (annually selected) B&M Student Council. For participation in the organization of the annual symposium as part of the Student Council, doctoral candidates can get credit points for transferable skills (NEUBM-307 Student council / Board Member).

Responsible person

B&M planning officer Katri Wegelius

Study materials

EN: Possible optional selected literature will be provided by the organisers for the symposium participants.

Completion method and assessment items	Recurrence	Credits
Method 1		1-2 cr
Participation in teaching		1-2 cr

NEUBM-103 B&M Symposium 3

NEUBM-103 B&M Symposium 3

NEUBM-103 B&M Symposium 3

Abbreviation: B&M Symposium 3

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	1-2 cr
Languages	English, Finnish
Grading scale	Pass-Fail
University	University of Helsinki
Responsible organisation	Doctoral Programme Brain and Mind 100%
Responsible person	Katri Wegelius, Responsible teacher
Study level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Learning outcomes

EN: The B&M Symposium creates a forum for researchers from different fields of neuroscience to meet, present their data and advance scientific discussion between doctoral candidates and senior researchers. Participants will gain in-depth knowledge from the symposium topics. In addition, they will learn presentation skills and have a possibility for networking with other researchers within the field.

Content

EN: International interdisciplinary symposium on neuroscience including talks from international experts, panel discussion and oral/poster presentations by doctoral candidates.

Additional information

EN: Target group

Annual participation in the B&M symposia is recommended for B&M doctoral candidates. Participation in one B&M symposium with poster/oral presentation (NEUBM-101) is obligatory.

Timing

Organized annually during the fall term.

Completion methods

Symposium lectures by international experts and alumni. Workshops and/or panel discussion on varying topics. Poster or snapshot session(s) with presentations by doctoral candidates.

Participation (minimum of 80%) in the symposium sessions and writing a learning diary for the lectures. 1 credit, and poster/oral presentation: 1 cr.

Assessment practices and criteria

Scale is pass/fail. Participation may be monitored by an attendance list or a learning diary.

The annual B&M symposium is organised by the (annually selected) B&M Student Council. For participation in the organization of the annual symposium as part of the Student Council, doctoral candidates can get credit points for transferable skills (NEUBM-703 Student council / Board Member).

Responsible person

B&M planning officer Katri Wegelius

Study materials

EN: Possible optional selected literature will be provided by the organisers for the symposium participants.

Completion method and assessment items	Recurrence	Credits
Method 1		1-2 cr
Participation in teaching		1-2 cr

NEUBM-104 B&M Symposium 4

NEUBM-104 B&M Symposium 4

NEUBM-104 B&M Symposium 4

Abbreviation: B&M Symposium 4

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	1-2 cr
Languages	English, Finnish
Grading scale	Pass-Fail
University	University of Helsinki
Responsible organisation	Doctoral Programme Brain and Mind 100%
Responsible person	Katri Wegelius, Responsible teacher
Study level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Learning outcomes

EN: The B&M Symposium creates a forum for researchers from different fields of neuroscience to meet, present their data and advance scientific discussion between doctoral candidates and senior researcher-

s. Participants will gain in-depth knowledge from the symposium topics. In addition, they will learn presentation skills and have a possibility for networking with other researchers within the field.

Content

EN: International interdisciplinary symposium on neuroscience including talks from international experts, panel discussion and oral/poster presentations by doctoral candidates.

Additional information

EN: Target group
Annual participation in the B&M symposia is recommended for B&M doctoral candidates. Participation in one B&M symposium with poster/oral presentation (NEUBM-101) is obligatory.

Timing

Organized annually during the fall term.

Completion methods

Symposium lectures by international experts and alumni. Workshops and/or panel discussion on varying topics. Poster or snapshot session(s) with presentations by doctoral candidates.

Participation (minimum of 80%) in the symposium sessions and writing a learning diary for the lectures. 1 credit, and poster/oral presentation: 1 cr.

Assessment practices and criteria

Scale is pass/fail. Participation may be monitored by an attendance list or a learning diary.

The annual B&M symposium is organised by the (annually selected) B&M Student Council. For participation in the organization of the annual symposium as part of the Student Council, doctoral candidates can get credit points for transferable skills (NEUBM-307 Student council / Board Member).

Responsible person

B&M planning officer Katri Wegelius

Study materials

EN: Possible optional selected literature will be provided by the organisers for the symposium participants.

Completion method and assessment items	Recurrence	Credits
Method 1		1-2 cr
Participation in teaching		1-2 cr

NEUBM-105 Scientific seminars, conferences, symposia

NEUBM-105 Scientific seminars, conferences, symposia

NEUBM-105 Scientific seminars, conferences, symposia

Abbreviation: Scientific semi

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	2-6 cr
Languages	English, Finnish
Grading scale	Pass-Fail
University	University of Helsinki
Responsible organisation	Doctoral Programme Brain and Mind 100%

Responsible person	Tomi Rantamäki, Responsible teacher
Study level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Learning outcomes

EN: Participation in academic conferences, symposia and seminars, and presentations of current research (poster or oral presentation) give doctoral students additional experience of performing, as well as the opportunity to learn new things and deepen their expertise in their field. In addition, students will have the opportunity to network both nationally and internationally.

Content

EN: Poster or oral presentation in an international conference and participation in the full conference.

Additional information

EN: Completion

- Short description and a certificate of the presentation are submitted as a substitution application in Sisu: https://studies.helsinki.fi/instructions/article/sisu-instructions-applying-credit-transfer
- 2 cr / different presentation and report, max 6 credits

Contact person:

B&M planning officer Katri Wegelius (Katri.wegelius@helsinki.fi)

Completion method and assessment items	Recurrence	Credits
Method 1		2-6 cr
Independent study		2-6 cr

NEUBM-106 Research visit

NEUBM-106 Research visit

NEUBM-106 Research visit

Abbreviation: Research visit

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	2-3 cr
Languages	English, Finnish
Grading scale	Pass-Fail
University	University of Helsinki
Responsible organisation	Doctoral Programme Brain and Mind 100%
Responsible person	Tomi Rantamäki, Responsible teacher
Study level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Learning outcomes

EN: After completing a research visit, doctoral candidates will

- have an in-depth understanding of a specific research area

- developed new skills and methods
- have developed and improved their collaboration and interaction skills
- have created a wider network of researchers and contacts

Content

EN: Visiting a research group to e.g. learn new techniques needed for the doctoral thesis project. Research visits will vary in length and content dependent on the subject area.

Additional information

EN: Completion methods

- Research visit
- Report

Assessment practices and criteria

Written report including a description of the research visit: where and when the training was done, experimental methods used, possible results, and discussion on the learning outcomes of the visit.

Feedback from the host/leader of the research group where the research visit was carried out.

Responsible person

B&M planning officer Katri Wegelius

Completion method and assessment items	Recurrence	Credits
Method 1		2-3 cr
Independent study		2-3 cr

NEUBM-107 Scientific publications not included in the thesis

NEUBM-107 Scientific publications not included in the thesis

NEUBM-107 Scientific publications not included in the thesis

Abbreviation: Scientific publ

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	1-4 cr
Languages	English, Finnish
Grading scale	Pass-Fail
University	University of Helsinki
Responsible organisation	Doctoral Programme Brain and Mind 100%
Responsible person	Tomi Rantamäki, Responsible teacher
Study level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Learning outcomes

EN: Writing articles is an essential part of doctoral training and the development of expertise. Publications advance the academic research career of doctoral students, increase their visibility in the academic com-

munity and make it possible to gain merit essential to an academic research career. Networking on national and international levels.

Content

EN: Writing publications not to be included in a doctoral dissertation.

Completion

1 credit / any scientific publication where the doctoral candidate is included

2 credits / first author publication.

Additional information

EN: Assessment practices and criteria: Pass, fail

- A doctoral candidate can earn ECTS from publications not to be included in his/her doctoral dissertation.
- A doctoral candidate writes a short description about their contribution to the publication and sends it with the digital object identifier (doi) to the Doctoral Programme, e.g. as a substitution application in Sisu: https://studies.helsinki.fi/instructions/article/sisu-instructions-applying-credit-transfer

The number of credits (max 4) is based on

- 1 credit / any scientific publication where the doctoral candidate is included
- 2 credits / scientific publication where the doctoral candidate is the first or last author

Contact

B&M planning officer Katri Wegelius (Katri.wegelius@helsinki.fi)

Completion method and assessment items	Recurrence	Credits
Method 1		1-4 cr
Independent study		1-4 cr

NEUBM-702 Public outreach in neuroscience

NEUBM-702 Public outreach in neuroscience

NEUBM-702 Public outreach in neuroscience

Abbreviation: Public outreach

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	1-4 cr
Languages	English, Finnish
Grading scale	Pass-Fail
University	University of Helsinki
Responsible organisation	Doctoral Programme Brain and Mind 100%
Responsible persons	Katri Wegelius, Administrative person Tomi Rantamäki, Responsible teacher
Study level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Learning outcomes

EN: The aim of this activity is to increase public awareness of neuroscience by different social outreach activities and to give tools to doctoral candidates to communicate their research to the public audience either by presenting or in writing.

Content

EN: The specific activities may include e.g. the following: visits to schools, lecture/poster presentations, popular science articles, newspaper articles and keeping a science blog. Many activities are intended to be organized during the annual Brain Awareness Week in March.

Additional information

EN: Target group: PhD and MSc students in the field of neuroscience.
Timing: Runs throughout the year as agreed separately with participants, focusing mainly for the Brain Awareness Week in mid-March. Please contact the responsible teacher for more information and material.

Completion methods

The activity includes independent homework, working in small groups, visiting relevant institutions and mentoring sessions by senior scientists.

1 cr for each specific social outreach activity (max 4).

Assessment practices and criteria

Pass/fail

Responsible person

Tomi Rantamäki and Katri Wegelius

Study materials

EN: A Moodle site is provided with useful templates and links to relevant sources.

Completion method and assessment items	Recurrence	Credits
Method 1		1-4 cr
Participation in teaching		1-4 cr

NEUBM-703 B&M Student Council / Board Member

NEUBM-703 B&M Student Council / Board Member
NEUBM-703 B&M Student Council / Board Member

Abbreviation: B&M Student Cou

Curriculum periods	2023-24, 2024-25, 2025-26
Validity period	since 1 Aug 2023
Credits	2-4 cr
Languages	English, Finnish
Grading scale	Pass-Fail
University	University of Helsinki
Responsible organisation	Doctoral Programme Brain and Mind 100%
Responsible person	Katri Wegelius, Responsible teacher

Study level	Postgraduate studies
Study field	Fields of education (Ministry of Education and Culture), Natural sciences

Learning outcomes

EN: After completion of the activity, the doctoral candidate has improved skills in eg. critical and analytical thinking, creativeness, risk managing, problem solving, networking, time-management, team work, innovativeness, project and financial management, science policy, societal impact, collaboration, mentoring.

Additional information

EN:

Target group

Doctoral candidates of the Doctoral Programme Brain & Mind

Optional. The course belongs to the following module: General competence/transferable skills

Completion methods

The doctoral candidate participates in the activities of

- the B&M Student Council (1-year membership; main duty is to organize the annual B&M Symposium), 2 cr and/or
- the B&M Board as a student member (2-year term; main duty is to participate in the meetings of the doctoral programme's decision-making body), 2 cr.

Responsible person

B&M planning officer Katri Wegelius

Completion method and assessment items	Recurrence	Credits
Method 1		2 cr
Participation in teaching (2 cr)		2 cr
Method 2		4 cr
Participation in teaching (4 cr)		4 cr