LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN

Module Catalogue

Master's Programme: Neurosciences

(Master of Science, M.Sc.)

(120 ECTS credits)

Based on the *Prüfungs- und Studienordnung* of 29.11.2019

88/430/---/M0/H/2018

Issued on 06 December 2019

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Abbreviations and annotations

CP	Credit Points, ECTS credits
ECTS	European Credit Transfer and Accumulation System
h	hours
SoSe	summer semester
SWS	contact hours
WiSe	winter semester
WP	compulsory elective
P	mandatory

1. The ECTS credits assigned in the Module Catalogue are designated as follows: Credit Points not listed in parentheses are awarded when the pertinent examination of the module or module parts have/has been completed successfully. Credit Points in parentheses are listed for calculatory purposes only.

2. The semester for taking a module can either be binding or may be considered as a recommendation, depending on the applicable data in Anlage 2 of the *Prüfungs- und Studienordnung* for your Programme. In this Module Catalogue, the options are indicated as „scheduled semester" and „recommended semester".

3. Please note: The Module Catalogue is merely intended to serve as an orientation whereas the provisions of the applicable version of the *Prüfungs- und Studienordnung* (in German only) of your Programme are legally binding. See: www.lmu.de/studienangebot and select your Programme.

Module: P 1 Fundamentals in Neuroscience I

Programme	Master's Programme: Neurosciences (Master of Science, M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self-study hours	ECTS
Lecture	P 1.1 Fundamentals in Neuroscience 1 - Lecture	WiSe	60 h (4 SWS)	90 h	(5)
Tutorial	P 1.2 Fundamentals in Neuroscience 1 - Tutorial	WiSe	15 h (1 SWS)	15 h	(1)

For successful completion of the module, 6 ECTS credits have to be acquired. Class attendance averages about 5 contact hours. Including time for self-study, 180 hours have to be invested.

Module type	Mandatory module with mandatory courses
Usability of the module in other Programmes	MSc Biochemistry, MSc Neurocognitive Psychology, MSc Human Biology, MSc other, BSc Biology extended
Elective guidelines	None
Entry requirements	None
Semester	Scheduled semester: 1
Duration	The completion of the module takes 1 semester.
Content	Lecture provides an introduction to fundamental principles in Neuroscience. The lecture consists of 27 topics which are organized in 4 blocks: (1) Cellular and molecular basics, synapses, electrophysiology, Neuronal networks (2) Nervous System Development (3) Comparative Neurobiology and Evolution of Brains (4) Plasticity: Learning and Memory. The lecure is accompanied by a tutorial which is a guided augmentation in topics of the lecture and basic knowledge from different fields by senior students of the MSc. Neurosciences program.
Learning outcomes	After successfully completing this module, students will have an insight in fundamental principles in neurosciences and are able to reproduce the covered topics.
Type of examination	Written exam or oral examination
Type of assessment	The successful completion of the module will be graded.
Requirements for the gain of ECTS credits	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully.

Responsible contact	Prof. Dr. Laura Busse
Language(s)	English
Additional information	Detailed schedule of topics, dates and lecture handouts are available at the LMU Online directory and accessible for registered students.

Module: P 2 Systems Neuroscience I

Programme	Master's Programme: Neurosciences (Master of Science, M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self-study hours	ECTS
Lecture	P 2.1 Systems Neuroscience 1 - Lecture	WiSe	30 h (2 SWS)	30 h	(2)
Seminar	P 2.2 Systems Neuroscience 1 - Seminar	WiSe	15 h (1 SWS)	15 h	(1)

For successful completion of the module, 3 ECTS credits have to be acquired. Class attendance averages about 3 contact hours. Including time for self-study, 90 hours have to be invested.

Module type	Mandatory module with mandatory courses
Usability of the module in other Programmes	Open for other MSc programs
Elective guidelines	None
Entry requirements	None
Semester	Scheduled semester: 1
Duration	The completion of the module takes 1 semester.
Content	The lecture General Sensory Physiology covers the principles of sensory processing, sensory-motor interactions, and the physics of adequate stimuli. A detailed description of the peripheral and central stages of each specific sensory system is accompanied by theoretical concepts of the underlying neuronal processing. The following topics are covered by participating lecturers: (1) An introduction to principles of invertebrate visual processing in the periphery and CNS, with an emphasis on neuronal substrates and models of motion detection (2) Fundamentals of visual processing in vertebrates: peripheral transduction, and neuronal representations of visual input across different stages of the central visual pathway (3) The mechanosensory lateral line system of aquatic animals and its role in the detection, identification and localisation of objects on the water surface or within the water body (4) Electroreception: peripheral and central properties of independently evolved systems, and the systems' role in object detection, orientation, and communication (5) The ontogenesis of the vestibular system and general

	aspects of sensory-motor interaction (6) Clinical aspects of disorders in the vestibular system of humans (7) Properties of diverse magnetoreceptive systems (8) Principles of several chemoreceptive systems, peripheral and central processes of the gustatory and the olfactory system, multimodal interactions (9) Peripheral and central stages of somatosensory systems, and their function (10) Mechanisms of pain, and temperature perception
Learning outcomes	Gain an understanding of the principles of peripheral and central sensory processing, as well as physiological and motor responses, and behavioural consequences. The students should be able to outline these basic principles and transfer their knowledge into an exam situation. Students will obtain the fundamental knowledge required to participate in further specialized courses of the Master Program and will acquire the basic knowledge prerequisite to physiological research.
Type of examination	Written exam and presentation
Type of assessment	The successful completion of the module will be graded.
Requirements for the gain of ECTS credits	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully.
Responsible contact	Prof. Dr. Oliver Behrend
Language(s)	English
Additional information	Detailed schedule of topics and dates and lecture handouts are available at the LMU Online directory and accessible for registered students.

Module: P 3 Research Project I

Programme	Master's Programme: Neurosciences (Master of Science, M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self-study hours	ECTS
Practical course	P 3.1 Research Project 1 - Practical Course	WiSe	75 h (5 SWS)	75 h	(5)
Seminar	P 3.2 Research Seminar - Topics in Neurosciences	WiSe	15 h (1 SWS)	15 h	(1)

For successful completion of the module, 6 ECTS credits have to be acquired. Class attendance averages about 6 contact hours. Including time for self-study, 180 hours have to be invested.

Module type	Mandatory module with mandatory courses
Usability of the module in other Programmes	None
Elective guidelines	The students choose a lab and research topic based on their own interest. It is recommended to study the research expertise of faculty members as available on our homepage: https://www.gsn.uni-muenchen.de/people/faculty
Entry requirements	None
Semester	Scheduled semester: 1
Duration	The completion of the module takes 1 semester.
Content	Content of this research project is guided work on a scientific question from the field of systems neurobiology.
Learning outcomes	Goal of this research project is gaining practice in elementary skills of scientific working and good laboratory practice.
Type of examination	Record and presentation
Type of assessment	The successful completion of the module will be graded.
Requirements for the gain of ECTS credits	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully.
Responsible contact	Members of the faculty of the Graduate School of Systemic Neurosciences
Language(s)	English
Additional information	None

Module: P 4 Methods in Neuroscience

Programme	Master's Programme: Neurosciences (Master of Science, M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self-study hours	ECTS
Exercise	P 4.1 Comparative Anatomy and Neuroanatomy - Practical Course	WiSe	45 h (3 SWS)	45 h	(3)
Exercise	P 4.2 Neurophysiology and Biophysics - Practical Course	WiSe	45 h (3 SWS)	45 h	(3)

For successful completion of the module, 6 ECTS credits have to be acquired. Class attendance averages about 6 contact hours. Including time for self-study, 180 hours have to be invested.

Module type	Mandatory module with mandatory courses
Usability of the module in other Programmes	None
Elective guidelines	None
Entry requirements	None
Semester	Scheduled semester: 1
Duration	The completion of the module takes 1 semester.
Content	Contents of this module are fundamental methods in neuroscience such as comparative neuroanatomy of vertebrates and electrophysiological properties of neurons.
Learning outcomes	In this module students are introduced to in neuroscience methods, project work, and analysis and presentation of data in systems neurobiology. The students will perform their own experiments is small groups.
Type of examination	Presentation
Type of assessment	The successful completion of the module will be graded.
Requirements for the gain of ECTS credits	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully.
Responsible contact	Dr. Rosario Sanchez Gonzalez & Dr. Cornelia Kopp-Scheinpflug
Language(s)	English

Additional information	Detailed course information is provided as handout.

Module: WP 1 Basics in Systemic, Cellular and Molecular Neuroscience

Programme	Master's Programme: Neurosciences (Master of Science, M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self-study hours	ECTS
Lecture	WP 1.1 Basics in Systemic, Cellular and Molecular Neuroscience - Lecture	WiSe	15 h (1 SWS)	15 h	(1)
Exercise	WP 1.2 Basics in Systemic, Cellular and Molecular Neuroscience - Practical Course	WiSe	30 h (2 SWS)	30 h	(2)

For successful completion of the module, 3 ECTS credits have to be acquired. Class attendance averages about 3 contact hours. Including time for self-study, 90 hours have to be invested.

Module type	Compulsory elective module with mandatory courses
Usability of the module in other Programmes	None
Elective guidelines	With regard to the compulsory elective fields "Systemic, Cellular and Molecular Neuroscience" and "Computational Neuroscience", one compulsory elective field must be choosen. By choosing the compulsory elective field "Computational Neuroscience", the compulsory elective modules WP 1, WP 4, WP 5, WP 7 and WP 8 must be taken.
Entry requirements	None
Semester	Recommended semester: 1
Duration	The completion of the module takes 1 semester.
Content	The module covers basic theoretical and practical principles in systemic, molecular and cellular neuroscience. Students perform own experiments including analysis and presentation in small groups.
Learning outcomes	Preparation, performance and analysis of neurobiological experiments using different methods.
Type of examination	Written exam
Type of assessment	The successful completion of the module will be graded.
Requirements for the gain of ECTS credits	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed

	successfully.
Responsible contact	Dr. Otto Albrecht
Language(s)	English
Additional information	Detailed course information is provided as handout.

Module: WP 2 Advanced Systemic, Cellular and Molecular Neuroscience

Programme	Master's Programme: Neurosciences (Master of Science, M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self-study hours	ECTS
Lecture	WP 2.1 Advanced Systemic, Cellular and Molecular Neuroscience - Lecture	WiSe	15 h (1 SWS)	15 h	(1)
Exercise	WP 2.2 Advanced Systemic, Cellular and Molecular Neuroscience - Practical Course	WiSe	75 h (5 SWS)	75 h	(5)

For successful completion of the module, 6 ECTS credits have to be acquired. Class attendance averages about 6 contact hours. Including time for self-study, 180 hours have to be invested.

Module type	Compulsory elective module with mandatory courses
Usability of the module in other Programmes	None
Elective guidelines	With regard to the compulsory elective fields "Systemic, Cellular and Molecular Neuroscience" and "Computational Neuroscience", one compulsory elective field must be choosen. By choosing the compulsory elective field " Systemic, Cellular and Molecular Neuroscience ", the compulsory elective modules WP 2, WP 3 and WP 6 must be taken.
Entry requirements	None
Semester	Recommended semester: 1
Duration	The completion of the module takes 1 semester.
Content	Contents of this module are fundamental methods in neuroscience such as neuroanatomy and neurohistology of vertebrate sensory systems and corresponding psychophysics.
Learning outcomes	In this module students are introduced to in neuroscience methods, project work, and analysis and presentation of data in systems neurobiology. The students will perform their own experiments is small groups.
Type of examination	Written exam
Type of assessment	The successful completion of the module will be graded.
Requirements for the gain of	ECTS credits will be granted when the module examination

ECTS credits	(or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully.
Responsible contact	Dr. Alexander Kaiser & Dr. Steffen Katzner
Language(s)	English
Additional information	Detailed course information is provided as handout.

Module: WP 3 Basics in Computational Neuroscience

Programme	Master's Programme: Neurosciences (Master of Science, M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self-study hours	ECTS
Lecture	WP 3.1 Basics in Computational Neuroscience - Lecture	WiSe	45 h (3 SWS)	45 h	(3)

For successful completion of the module, 3 ECTS credits have to be acquired. Class attendance averages about 3 contact hours. Including time for self-study, 90 hours have to be invested.

Module type	Compulsory elective module with mandatory course
Usability of the module in other Programmes	Basic course in related MSc programs
Elective guidelines	With regard to the compulsory elective fields "Systemic, Cellular and Molecular Neuroscience" and "Computational Neuroscience", one compulsory elective field must be choosen. By choosing the compulsory elective field " Systemic, Cellular and Molecular Neuroscience ", the compulsory elective modules WP 2, WP 3 and WP 6 must be taken.
Entry requirements	None
Semester	Recommended semester: 1
Duration	The completion of the module takes 1 semester.
Content	The lecture builds on high-school-level mathematics (Abiturniveau) and aims to provide an overview of current theoretical, mathematical and computational methods and models used in neuroscience. The following topics are addressed: Biophysics and electrical models of the cell membrane, equivalent circuits, Hodgkin-Huxley equations, phase-plane analysis, neural oscillator models, basics of neuronal coding and decoding, supervised (classification, regression) and unsupervised (clustering, dimensionality reduction, principal component analysis) methods for data analysis.
Learning outcomes	The students will be able to understand the functioning and applicability of standard computational neuroscience methods, and be able to interpret results derived with these methods.
Type of examination	Written exam or oral examination

Type of assessment	The successful completion of the module will be graded.
Requirements for the gain of ECTS credits	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully.
Responsible contact	Prof. Andreas Herz
Language(s)	English
Additional information	None

Module: WP 4 Theoretical Biophysics and Cellular Physiology

Programme	Master's Programme: Neurosciences (Master of Science, M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self-study hours	ECTS
Lecture	WP 4.1 Theoretical Biophysics and Cellular Physiology - Lecture	WiSe	30 h (2 SWS)	30 h	(2)
Exercise	WP 4.2 Theoretical Biophysics and Cellular Physiology - Practical Course	WiSe	30 h (2 SWS)	0 h	(1)

For successful completion of the module, 3 ECTS credits have to be acquired. Class attendance averages about 4 contact hours. Including time for self-study, 90 hours have to be invested.

Module type	Compulsory elective module with mandatory courses
Usability of the module in other Programmes	Other related MSc programs
Elective guidelines	With regard to the compulsory elective fields "Systemic, Cellular and Molecular Neuroscience" and "Computational Neuroscience", one compulsory elective field must be choosen. By choosing the compulsory elective field "Computational Neuroscience", the compulsory elective modules WP 1, WP 4, WP 5, WP 7 and WP 8 must be taken.
Entry requirements	None
Semester	Recommended semester: 1
Duration	The completion of the module takes 1 semester.
Content	The lecture builds on the Bachelor's level mathematics and physics (BSc. Biology), and aims to provide an overview and fundamental understanding of standard models and methods used to describe information processing in single neurons and small networks of neurons. The following topics will be addressed: Diffusion, electrical models of the membrane, Goldman-Hodgkin-Katz Flux and equilibrium voltage, equivalent circuits, Hodgkin-Huxley equations, phase-plane analysis, neural oscillator models, linear stability analysis, graded-response models, bistability and competition in networks of graded-response neurons, models of synaptic short-term plasticity, local field potentials. In the exercise, the students will solve mathematical and programming problems that help them to more deeply understand and critically discuss topics of the lecture:

	Diffusion, electrical models of the membrane, Goldman-Hodgkin-Katz Flux and equilibrium voltage, equivalent circuits, Hodgkin-Huxley equations, phase-plane analysis, neural oscillator models, linear stability analysis, graded-response models, bistability and competition in networks of graded response neurons, models of synaptic short-term plasticity, local field potentials.
Learning outcomes	The students will be able to integrate knowledge from experimental and theoretical cellular neurophysiology. They will be able apply to apply this knowledge to evaluate experimental findings and to critically assess the outcome of modeling studies. Students will also be able to devise simple mathematical models to describe neurophysiological phenomena. The students will be able to use mathematical and computational methods to solve standard problems in theoretical neurophysiology and communicate their findings to experimental and computational neuroscientists.
Type of examination	Written exam or oral examination
Type of assessment	The successful completion of the module will be graded.
Requirements for the gain of ECTS credits	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully.
Responsible contact	Prof. Christian Leibold
Language(s)	English
Additional information	None

Module: WP 5 The Neural Code

Programme	Master's Programme: Neurosciences (Master of Science, M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self-study hours	ECTS
Lecture	WP 5.1 The Neural Code - Lecture	WiSe	30 h (2 SWS)	0 h	(1)
Exercise	WP 5.2 The Neural Code - Practical Course	WiSe	30 h (2 SWS)	30 h	(2)

For successful completion of the module, 3 ECTS credits have to be acquired. Class attendance averages about 4 contact hours. Including time for self-study, 90 hours have to be invested.

Module type	Compulsory elective module with mandatory courses
Usability of the module in other Programmes	Other related MSc programs
Elective guidelines	With regard to the compulsory elective fields "Systemic, Cellular and Molecular Neuroscience" and "Computational Neuroscience", one compulsory elective field must be choosen. By choosing the compulsory elective field "Computational Neuroscience", the compulsory elective modules WP 1, WP 4, WP 5, WP 7 and WP 8 must be taken.
Entry requirements	None
Semester	Recommended semester: 1
Duration	The completion of the module takes 1 Semester.
Content	The lecture builds on the Bachelor's level mathematics and physics (BSc. Biology), and aims to provide an overview and fundamental understanding of standard methods and analytical techniques used to quantify neuronal activity and information processing. The following topics are addressed: Spectral analysis, convolution, linear systems theory, receptive fields, spike-triggered averages, reverse correlation, Bayesian decoding, Fisher Information, Gibbs-Shannon Information. In the exercise, the students will solve mathematical and programming problems that help them to more deeply understand and critically discuss topics of the lecture: Spectral analysis, convolution, linear systems theory, receptive fields, spike triggered averages, reverse correlation, Bayesian decoding, Fisher Information, Gibbs-Shannon Information.

Learning outcomes	The students will be able to integrate knowledge from experimental and theoretical systems neuroscience. They will be able apply to apply this knowledge to evaluate experimental findings and to critically assess the outcome of data analytical studies. Students will also be able to devise simple statistical analyses to describe systems-neuroscience phenomena. The students will be able to use mathematical and computational methods to solve standard problems in theoretical systems neuroscience and communicate their findings to experimental and computational neuroscientists.
Type of examination	Written exam
Type of assessment	The successful completion of the module will be graded.
Requirements for the gain of ECTS credits	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully.
Responsible contact	Dr. Thomas Wachtler
Language(s)	English
Additional information	None

Module: P 5 Fundamentals in Neuroscience II

Programme	Master's Programme: Neurosciences (Master of Science, M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self-study hours	ECTS
Lecture	P 5.1 Fundamentals in Neuroscience 2 - Lecture	SoSe	60 h (4 SWS)	90 h	(5)
Tutorial	P 5.2 Fundamentals in Neuroscience 2 - Tutorial	SoSe	15 h (1 SWS)	15 h	(1)

For successful completion of the module, 6 ECTS credits have to be acquired. Class attendance averages about 5 contact hours. Including time for self-study, 180 hours have to be invested.

Module type	Mandatory module with mandatory courses
Usability of the module in other Programmes	MSc Biochemistry, MSc Neurocognitive Psychology, MSc Human Biology, MSc other, BSc Biology extended
Elective guidelines	None
Entry requirements	None
Semester	Scheduled semester: 2
Duration	The completion of the module takes 1 semester.
Content	Lecture provides an introduction to fundamental principles in Neuroscience. The lecture consists of 21 topics which are organized in 4 blocks: (1) Motor Systems (2) Neuroethology (3) Cognition (4) Translational Neuroscience. The lecure is accompanied by a tutorial which is a guided augmentation in topics of the lecture and basic knowledge from different fields by senior students of the MSc. Neurosciences program.
Learning outcomes	After successfully completing this module, students will have an insight in fundamental principles in neurosciences and are able to reproduce the covered topics.
Type of examination	Written exam or oral examination
Type of assessment	The successful completion of the module will be graded.
Requirements for the gain of ECTS credits	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully.
Responsible contact	Prof. Laura Busse

Language(s)	English
Additional information	Detailed schedule of topics, dates and lecture handouts are available at the LMU Online directory and accessible for registered students.

Module: P 6 Neurophilosophy

Programme	Master's Programme: Neurosciences (Master of Science, M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self-study hours	ECTS
Lecture	P 6.1 Neurophilosophy - Lecture	SoSe	30 h (2 SWS)	60 h	(3)
Seminar	P 6.2 Neurophilosophy - Seminar	WiSe	30 h (2 SWS)	150 h	(6)

For successful completion of the module, 9 ECTS credits have to be acquired. Class attendance averages about 4 contact hours. Including time for self-study, 270 hours have to be invested.

Module type	Mandatory module with mandatory courses
Usability of the module in other Programmes	Other related MSc programs
Elective guidelines	None
Entry requirements	None
Semester	Scheduled semester: 1 and 2
Duration	The completion of the module takes 2 semesters.
Content	Contents of this module are: (I) Philosophy of Mind (Perception, Language, Cognition, Consciousness, Mind-Body-Problem); (II) Anthropology (Ethics, Free Will and Responsibility, Determinism); (III) Philosophy of Science (Methodology, Theory and Experience, Explanation, Reductionism); (IV) Neuroscience and the History of Ideas.
Learning outcomes	Goal of this module is gaining knowledge of central neurophilosophical questions and methods; Capability to analyze, critically discuss, and work out well-reasoned positions in the field of neurophilosophy, both in systematic and historical perspectives.
Type of examination	Presentation and essay
Type of assessment	The successful completion of the module will be graded.
Requirements for the gain of ECTS credits	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully.
Responsible contact	Prof. Stephan Sellmaier & Prof Ophelia Deroy

Language(s)	English
Additional information	None

Module: P 7 Research Project II

Programme	Master's Programme: Neurosciences (Master of Science, M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self-study hours	ECTS
Practical course	P 7.1 Research Project 2 - Practical Course	SoSe	75 h (5 SWS)	75 h	(5)
Seminar	P 7.2 Research Seminar - Advanced Topics in Neurosciences	SoSe	15 h (1 SWS)	15 h	(1)

For successful completion of the module, 6 ECTS credits have to be acquired. Class attendance averages about 6 contact hours. Including time for self-study, 180 hours have to be invested.

Module type	Mandatory module with mandatory courses
Usability of the module in other Programmes	None
Elective guidelines	The students choose a lab and research topic based on their own interest. It is recommended to study the research expertise of faculty members as available on our homepage: https://www.gsn.uni-muenchen.de/people/faculty
Entry requirements	None
Semester	Scheduled semester: 2
Duration	The completion of the module takes 1 semester.
Content	Content of this research project is guided work on a scientific question from the field of systems neurobiology.
Learning outcomes	Goal of this research project is gaining practice in elementary skills of scientific working and good laboratory practice.
Type of examination	Report and presentation
Type of assessment	The successful completion of the module will be graded.
Requirements for the gain of ECTS credits	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully.
Responsible contact	Members of the faculty of the Graduate School of Systemic Neurosciences
Language(s)	English

Additional information	None

Module: WP 6 Special Methods in Systemic, Cellular and Molecular Neuroscience for Experts

Programme	Master's Programme: Neurosciences (Master of Science, M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self-study hours	ECTS
Lecture	WP 6.1 Special Methods in Systemic, Cellular and Molecular Neuroscience for Experts - Lecture	SoSe	30 h (2 SWS)	60 h	(3)
Exercise	WP 6.2 Special Methods in Systemic, Cellular and Molecular Neuroscience for Experts - Practical Course	SoSe	90 h (6 SWS)	90 h	(6)
Seminar	WP 6.3 Special Methods in Systemic, Cellular and Molecular Neuroscience for Experts - Seminar	SoSe	30 h (2 SWS)	60 h	(3)

For successful completion of the module, 12 ECTS credits have to be acquired. Class attendance averages about 10 contact hours. Including time for self-study, 360 hours have to be invested.

Module type	Compulsory elective module with mandatory courses
Usability of the module in other Programmes	None
Elective guidelines	With regard to the compulsory elective fields "Systemic, Cellular and Molecular Neuroscience" and "Computational Neuroscience", one compulsory elective field must be choosen. By choosing the compulsory elective field " Systemic, Cellular and Molecular Neuroscience ", the compulsory elective modules WP 2, WP 3 and WP 6 must be taken.
Entry requirements	None
Semester	Recommended Semester: 2
Duration	The completion of the module takes 1 Semester.
Content	Theoretical and practical knowledge in molecular mechanisms of neurogenesis, neuronal differentiation, circuit formation, synaptogenesis, signal transduction and plasticity.
Learning outcomes	Goal of this module is to obtain secure fundamental knowledge in theory and methods of molecular neurobiology.

Type of examination	Written exam and presentation
Type of assessment	The successful completion of the module will be graded.
Requirements for the gain of ECTS credits	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully.
Responsible contact	Dr. Giacomo Masserdotti
Language(s)	English
Additional information	Detailed course information is provided as handout.

Module: WP 7 Machine Learning and Analysis of Neural Data

Programme	Master's Programme: Neurosciences (Master of Science, M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self-study hours	ECTS
Lecture	WP 7.1 Machine Learning and Analysis of Neural Data - Lecture	SoSe	30 h (2 SWS)	60 h	(3)
Exercise	WP 7.2 Machine Learning and Analysis of Neural Data - Practical Course	SoSe	45 h (3 SWS)	135 h	(6)

For successful completion of the module, 9 ECTS credits have to be acquired. Class attendance averages about 5 contact hours. Including time for self-study, 270 hours have to be invested.

Module type	Compulsory elective module with mandatory courses
Usability of the module in other Programmes	Other related MSc programs
Elective guidelines	With regard to the compulsory elective fields "Systemic, Cellular and Molecular Neuroscience" and "Computational Neuroscience", one compulsory elective field must be choosen. By choosing the compulsory elective field "Computational Neuroscience", the compulsory elective modules WP 1, WP 4, WP 5, WP 7 and WP 8 must be taken.
Entry requirements	None
Semester	Recommended Semester: 2
Duration	The completion of the module takes 1 semester.
Content	The lecture builds on WP4 and WP5 and aims to provide an overview of important advanced data-analysis methods derived from neuroscientific principles and/or applied in neuroscience. The following topics will be covered: Perceptron and linear separability, logistic regression, cross validation, multilayer networks, backpropagation, empirical risk minimization, regression, density estimation, regularization, support-vector machines, optimization with constraints, kernel trick, bootstrapping, clustering, Bayesian networks, hidden Markov models, dimensionality-reduction techniques, time-series-analysis methods (multitaper estimators, wavelet decomposition, multivariate spectral estimators, hybrid time series), circular statistics. In the exercise, the students will solve substantial mathematical and programming problems that help them to

	more deeply understand and critically discuss topics of the lecture: Perceptron and linear separability, Logistic Regression, Cross validation, Multilayer networks, Backpropagation, Empirical Risk Minimization, Regression, Density Estimation, Regularization, Support Vector Machines, Optimization with constraints, Kernel trick, Bootstrapping, Clustering, Bayesian networks, hidden Markov models, dimensionality reduction techniques, time series analysis methods (multitaper estimators, wavelet decomposition, multivariate spectral estimators, hybrid time series), circular statistics.
Learning outcomes	The students will be able to understand the functioning and applicability of important advanced data-analysis methods derived from neuroscientific principles and/or applied in neuroscience, and be able to interpret results derived with these methods. The students will be able to apply the most important advanced data analytical methods derived from neuroscientific principles and/or applied in neuroscience. They will also learn to communicate the outcomes of their work to experimental and computational neuroscientists.
Type of examination	Written exam and presentation
Type of assessment	The successful completion of the module will be graded.
Requirements for the gain of ECTS credits	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully.
Responsible contact	Prof. Christian Leibold
Language(s)	English
Additional information	None

Module: WP 8 Mathematical Models of Neural Systems and Cognitive Functions

Programme	Master's Programme: Neurosciences (Master of Science, M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self-study hours	ECTS
Lecture	WP 8.1 Mathematical Models of Neural Systems and Cognitive Functions - Lecture	SoSe	30 h (2 SWS)	0 h	(1)
Exercise	WP 8.2 Mathematical Models of Neural Systems and Cognitive Functions - Practical Course	SoSe	30 h (2 SWS)	30 h	(2)

For successful completion of the module, 3 ECTS credits have to be acquired. Class attendance averages about 4 contact hours. Including time for self-study, 90 hours have to be invested.

Module type	Compulsory elective module with mandatory courses
Usability of the module in other Programmes	Other MSc programs
Elective guidelines	With regard to the compulsory elective fields "Systemic, Cellular and Molecular Neuroscience" and "Computational Neuroscience", one compulsory elective field must be choosen. By choosing the compulsory elective field "Computational Neuroscience", the compulsory elective modules WP 1, WP 4, WP 5, WP 7 and WP 8 must be taken.
Entry requirements	None
Semester	Recommended Semester: 2
Duration	The completion of the module takes 1 semester.
Content	The lecture builds on WP4 and WP5 and aims to provide an overview and fundamental understanding of a selection of advanced models and methods from computational neuroscience. The following topics will be addressed: Attractor models (Fixed-point, sequences, and continuous attractors) and applications, neural network oscillations, modelling decision making, Hebbian learning and receptive-field formation, population coding in vision, decoding dynamic auditory and visual scenes. In the exercise, the students will solve mathematical and programming problems that help them to more deeply understand and critically discuss topics of the lecture: Attractor models (Fixed-point, sequences, and continuous attractors) and applications, neural network oscillations,

	modelling decision making, Hebbian learning and receptive-field formation, population coding in vision, decoding dynamic auditory and visual scenes.
Learning outcomes	The students will be able to integrate knowledge from experimental and theoretical neuroscience. They will be able apply to apply this knowledge to evaluate experimental findings and to critically assess the outcome of modeling studies.
Type of examination	Written exam
Type of assessment	The successful completion of the module will be graded.
Requirements for the gain of ECTS credits	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully. The students will be able to use mathematical and computational methods to solve advanced problems in theoretical neuroscience and communicate their findings to experimental and computational neuroscientists.
Responsible contact	Prof. Christian Leibold
Language(s)	English
Additional information	None

Module: WP 9 Systems Neuroscience II

Programme	Master's Programme: Neurosciences (Master of Science, M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self-study hours	ECTS
Lecture	WP 9.1 Systems Neuroscience 2 - Lecture	SoSe	30 h (2 SWS)	30 h	(2)
Seminar	WP 9.2 Systems Neuroscience 2 - Seminar	SoSe	15 h (1 SWS)	15 h	(1)

For successful completion of the module, 3 ECTS credits have to be acquired. Class attendance averages about 3 contact hours. Including time for self-study, 90 hours have to be invested.

Module type	Compulsory elective module with mandatory courses
Usability of the module in other Programmes	Other MSc programs
Elective guidelines	With regard to the compulsory elective modules WP 9 and WP 10, one compulsory elective must be taken.
Entry requirements	None
Semester	Recommended semester: 2
Duration	The completion of the module takes 1 semester.
Content	This series of lectures offers detailed insight into the fundamentals underlying mammalian - including human - vision and hearing. The lectures cover a wide range of topics including basics, main neuronal structures and processing principles within the visual and auditory pathway as well as interesting psychophysical phenomena.
Learning outcomes	Knowledge of principles of auditory and visualneuronal processing including behavioural consequences. The students should be able to outline these basic principles and transfer their knowledge into an exam situation. Students will obtain the fundamental knowledge required to participate in further specialized courses of the Master Program and will acquire the basic knowledge prerequisite to physiological research.
Type of examination	Written exam and presentation
Type of assessment	The successful completion of the module will be graded.
Requirements for the gain of ECTS credits	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed

	successfully.
Responsible contact	Prof. Oliver Behrend
Language(s)	English
Additional information	Detailed schedule of topics and dates and lecture handouts are available at the LMU Online directory and accessible for registered students.

Module: WP 10 Biomedical Neuroscience

Programme	Master's Programme: Neurosciences (Master of Science, M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self-study hours	ECTS
Lecture	WP 10.1 Biomedical Neuroscience - Lecture	SoSe	30 h (2 SWS)	30 h	(2)
Seminar	WP 10.2 Biomedical Neuroscience - Seminar	SoSe	15 h (1 SWS)	15 h	(1)

For successful completion of the module, 3 ECTS credits have to be acquired. Class attendance averages about 3 contact hours. Including time for self-study, 90 hours have to be invested.

Module type	Compulsory elective module with mandatory courses
Usability of the module in other Programmes	Other MSc programs
Elective guidelines	With regard to the compulsory elective modules WP 9 and WP 10, one compulsory elective must be taken.
Entry requirements	None
Semester	Recommended Semester: 2
Duration	The completion of the module takes 1 semester.
Content	The lecture offers a comprehensive introduction to clinical research in the neurosciences. It covers basic aspects not included in the standard neuroscience curriculum, including methods specific to clinical neuroscience. The last part of the lecture introduces the students to the important topic of clinical trials and their specific considerations. Topics are: (1) basics: functional neuroanatomy, pathophysiology, pharmacology, epidemiology, neuropsychology; (2) methods: principles of experimental research with patients, imaging, therapeutic principles, statistics; (3) clinical trials: planning, ethical and legal aspects, recruitment, documentation, data management and analysis The seminar covers original publications related to the topics of the lecture.
Learning outcomes	Based on Fundamental Neuroscience, the students will learn specific aspects of Biomedical Neuroscience including Clinical aspects of neurological diseases and therapeutic advances based on Translational Neuroscience.

Type of examination	Written exam and presentation
Type of assessment	The successful completion of the module will be graded.
Requirements for the gain of ECTS credits	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully.
Responsible contact	Dr. Valerie Kirsch
Language(s)	English
Additional information	Detailed schedule of topics and dates and lecture handouts are available at the LMU Online directory and accessible for registered students.

Module: P 8 Lab Rotation

Programme	Master's Programme: Neurosciences (Master of Science, M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self-study hours	ECTS
Exercise	P 8.1 Laboratory Internship	WiSe and SoSe	45 h (3 SWS)	15 h	(2)
Seminar	P 8.2 Lab Rotation - Seminar	WiSe	15 h (1 SWS)	15 h	(1)

For successful completion of the module, 3 ECTS credits have to be acquired. Class attendance averages about 4 contact hours. Including time for self-study, 90 hours have to be invested.

Module type	Mandatory module with mandatory courses
Usability of the module in other Programmes	None
Elective guidelines	The students choose a lab and research topic based on their own interest. It is recommended to study the research expertise of faculty members as available on our homepage: https://www.gsn.uni-muenchen.de/people/faculty
Entry requirements	None
Semester	Recommended semester: 3
Duration	The completion of the module takes 1 semester.
Content	The students participate in different methodological activities in a choosen lab.
Learning outcomes	Insight into organization, experimental setups, analyzing data and discussions in order to investigate neuroscientific questions.
Type of examination	Report or presentation
Type of assessment	The successful completion of the module will be graded.
Requirements for the gain of ECTS credits	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully.
Responsible contact	Members of the faculty of the Graduate School of Systemic Neurosciences

Language(s)	English
Additional information	None

Module: P 9 Research Project III

Programme	Master's Programme: Neurosciences (Master of Science, M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self-study hours	ECTS
Practical course	P 9.1 Research Project 3 - Practical Course	WiSe	75 h (5 SWS)	75 h	(5)
Seminar	P 9.2 Research Seminar - Special Topics in Neurosciences	WiSe	15 h (1 SWS)	15 h	(1)

For successful completion of the module, 6 ECTS credits have to be acquired. Class attendance averages about 6 contact hours. Including time for self-study, 180 hours have to be invested.

Module type	Mandatory module with mandatory courses
Usability of the module in other Programmes	None
Elective guidelines	The students choose a lab and research topic based on their own interest. It is recommended to study the research expertise of faculty members as available on our homepage: https://www.gsn.uni-muenchen.de/people/faculty
Entry requirements	None
Semester	Recommended semester: 3
Duration	The completion of the module takes 1 semester.
Content	Content of this research project is guided work on a scientific question from the field of systems neurobiology.
Learning outcomes	Goal of this research project is gaining practice in elementary skills of scientific working and good laboratory practice.
Type of examination	Report and presentation
Type of assessment	The successful completion of the module will be graded.
Requirements for the gain of ECTS credits	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully.
Responsible contact	Members of the faculty of the Graduate School of Systemic Neurosciences
Language(s)	English

Additional information None

Module: P 10 Teaching and Training

Programme	Master's Programme: Neurosciences (Master of Science, M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self-study hours	ECTS
Tutorial	P 10.1 Tutoring for Beginners	WiSe and SoSe	15 h (1 SWS)	15 h	(1)
Workshop	P 10.2 Non-Scientific Skills	WiSe and SoSe	15 h (1 SWS)	15 h	(1)
Workshop	P 10.3 Vocational Training	WiSe and SoSe	15 h (1 SWS)	15 h	(1)

For successful completion of the module, 3 ECTS credits have to be acquired. Class attendance averages about 3 contact hours. Including time for self-study, 90 hours have to be invested.

Module type	Mandatory module with mandatory courses
Usability of the module in other Programmes	None
Elective guidelines	The tutorial is scheduled and organized by the students. The Non-Scientific Skills workshops are announced at the GSN homepage: http://www.gsn.uni-muenchen.de/seminars_events/workshops
Entry requirements	None
Semester	Recommended semester: 3
Duration	The completion of the module takes 2 semester.
Content	Contents of this module are specialized complementary skills e.g. teaching as well as social, lingual and time management skills.
Learning outcomes	The students will learn to organize and perform training for fellow students. The Scientific Skills Workshops prepare the student for different career demands.
Type of examination	Presentation
Type of assessment	The succesful completion of the module will not be graded.
Requirements for the gain of ECTS credits	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully.
Responsible contact	Dr. Alexander Kaiser
Language(s)	English

Additional information None

Module: WP 11-14 Interdisciplinary and Advanced Topics in Neurosciences I-IV

Programme	Master's Programme: Neurosciences (Master of Science, M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self-study hours	ECTS
Lecture	WP 11.1 Interdisciplinary Training 1 - Lecture	WiSe and SoSe	30 h (2 SWS)	60 h	(3)

For successful completion of the module, 3 ECTS credits have to be acquired. Class attendance averages about 2 contact hours. Including time for self-study, 90 hours have to be invested.

Module type	Compulsory elective module with mandatory course
Usability of the module in other Programmes	None
Elective guidelines	With regard to the compulsory elective modules WP 11 - WP 22, four compulsory elective modules must be taken. The students select courses from a list of courses on their own interest. The available courses are listed in the LMU online directory (LSF).
Entry requirements	None
Semester	Recommended semester: 3
Duration	The completion of the module takes 1 semester.
Content	Contents of this module are additional theoretical and practical skills in the scientific field of individual interest, and interdisciplinary scientific discussions.
Learning outcomes	The students will learn to focus on their own scientific profile. Furthermore the students gain practice integrating insights from different fields on a common topic and enhance their ability to take part in interdisciplinary discussions.
Type of examination	Written exam
Type of assessment	The successful completion of the module will be graded.
Requirements for the gain of ECTS credits	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed successfully.

Responsible contact	Members of the faculty of the Graduate School of Systemic Neurosciences
Language(s)	English
Additional information	None

Module: WP 15-18 Interdisciplinary and Advanced Topics in Neurosciences V-VIII

Programme	Master's Programme: Neurosciences (Master of Science, M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self-study hours	ECTS
Seminar	WP 15.1 Interdisciplinary Training 5 - Seminar	WiSe and SoSe	30 h (2 SWS)	60 h	(3)

For successful completion of the module, 3 ECTS credits have to be acquired. Class attendance averages about 2 contact hours. Including time for self-study, 90 hours have to be invested.

Module type	Compulsory elective module with mandatory course
Usability of the module in other Programmes	None
Elective guidelines	With regard to the compulsory elective modules WP 11 - WP 22, four compulsory elective modules must be taken. The students select courses from a list of courses on their own interest. The available courses are listed in the LMU online directory (LSF).
Entry requirements	None
Semester	Recommended semester: 3
Duration	The completion of the module takes 1 semester.
Content	Contents of this module are additional theoretical and practical skills in the scientific field of individual interest, and interdisciplinary scientific discussions.
Learning outcomes	The students will learn to focus on their own scientific profile. Furthermore the students gain practice integrating insights from different fields on a common topic and enhance their ability to take part in interdisciplinary discussions.
Type of examination	Presentation
Type of assessment	The successful completion of the module will be graded.
Requirements for the gain of ECTS credits	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed

	successfully.
Responsible contact	Members of the faculty of the Graduate School of Systemic Neurosciences
Language(s)	English
Additional information	None

Module: WP 19-22 Interdisciplinary and Advanced Topics in Neurosciences IX-XII

Programme	Master's Programme: Neurosciences (Master of Science, M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self-study hours	ECTS
Exercise	WP 19.1 Interdisciplinary Training 9 - Practical Course	WiSe and SoSe	45 h (3 SWS)	45 h	(3)

For successful completion of the module, 3 ECTS credits have to be acquired. Class attendance averages about 3 contact hours. Including time for self-study, 90 hours have to be invested.

Module type	Compulsory elective module with mandatory course
Usability of the module in other Programmes	None
Elective guidelines	With regard to the compulsory elective modules WP 11 - WP 22, four compulsory elective modules must be taken. The students select courses from a list of courses on their own interest. The available courses are listed in the LMU online directory (LSF).
Entry requirements	None
Semester	Recommended semester: 3
Duration	The completion of the module takes 1 semester.
Content	Contents of this module are additional theoretical and practical skills in the scientific field of individual interest, and interdisciplinary scientific discussions.
Learning outcomes	The students will learn to focus on their own scientific profile. Furthermore the students gain practice integrating insights from different fields on a common topic and enhance their ability to take part in interdisciplinary discussions.
Type of examination	Presentation or report
Type of assessment	The successful completion of the module will be graded.
Requirements for the gain of ECTS credits	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have been completed

	successfully.
Responsible contact	Members of the faculty of the Graduate School of Systemic Neurosciences
Language(s)	English
Additional information	None

Module: P 11 Special Topics in Neurosciences

Programme	Master's Programme: Neurosciences (Master of Science, M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self-study hours	ECTS
Colloquium	P 11.1 Special Topics in Neurosciences - Colloquium	WiSe and SoSe	15 h (1 SWS)	30 h	(1,5)
Seminar	P 11.2 Neurosciences - Research Seminar	WiSe and SoSe	15 h (1 SWS)	30 h	(1,5)

For successful completion of the module, 3 ECTS credits have to be acquired. Class attendance averages about 2 contact hours. Including time for self-study, 90 hours have to be invested.

Module type	Mandatory module with mandatory courses
Usability of the module in other Programmes	None
Elective guidelines	The students choose a lab and research topic based on their own experience and interest. It is recommended to study the research expertise of faculty members as available on our homepage: https://www.gsn.uni-muenchen.de/people/faculty
Entry requirements	None
Semester	Recommended semester: 4
Duration	The completion of the module takes 1 semester.
Content	In addition to prepare and write the master thesis, students have to participate in Research Seminars of the supervisors research group and present the own project.
Learning outcomes	The students will learn about experimental designs, analysis and interpretation of results, good scientific praxis as of DFG guidelines and ethical issues related to Neuroscience Research.
Type of examination	Presentation
Type of assessment	The succesful completion of the module will not be graded.
Requirements for the gain of ECTS	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have

credits	been completed successfully.
Responsible contact	Supervisor of master thesis.
Language(s)	English
Additional information	DFG Guidelines for Good Scientific Praxis: https://www.dfg.de/en/research_funding/principles_dfg_funding/good_scientific_practice

Module: P 12 Final Module

Programme	Master's Programme: Neurosciences (Master of Science, M.Sc.)

Related module parts

Course type	Course (mandatory)	Rotation	Contact hours	Self-study hours	ECTS
Master Thesis	P 12.1 Master Thesis	WiSe and SoSe	-	780 h	(26)
Disputation	P 12.2 Disputation	WiSe and SoSe	-	30 h	(1)

For successful completion of the module, 27 ECTS credits have to be acquired. Including time for self-study, 810 hours have to be invested.

Module type	Mandatory module
Usability of the module in other Programmes	None
Elective guidelines	The students choose a lab and research topic based on their own experience and interest. It is recommended to study the research expertise of faculty members as available on our homepage: https://www.gsn.uni-muenchen.de/people/faculty
Entry requirements	Successful completion of the modules P 1 - P 5 and P7 and successful completion of compulsory elective modules with a total value of 24 ECTS credits from WP 1 - WP 10
Semester	Recommend semester: 4
Duration	The completion of the module takes 1 semester.
Content	Contents of this module is preparing writing the master thesis and presenting the thesis at the disputation.
Learning outcomes	The goal of this module is to transfer the acquired theoretical and methodical knowledge to a given scientific question and to independently interpret individually gained data. Furthermore students shall be able to competently participate and lead scientific discussions.
Type of examination	Master Thesis and disputation
Type of assessment	The successful completion of the module will be graded.
Requirements for the gain of ECTS	ECTS credits will be granted when the module examination (or the examination of pertinent mandatory and potential elective compulsory module parts) has/have

credits	been completed successfully.
Responsible contact	Supervisor of master thesis
Language(s)	English
Additional information	DFG Guidelines for Good Scientific Praxis: https://www.dfg.de/en/research_funding/principles_dfg_funding/good_scientific_ practice