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First year courses

## **Research Master Specialisation Neuropsychology year 1**

Faculty of Psychology and Neuroscience

### **Brain Damage**

#### **Full course description**

Much of what we know about cognitive and affective functions and processes comes from close observation of patients with acquired damage to the central nervous system. This course reviews mechanisms underlying the brain-behavior relationships that form the basis of neuropsychological dysfunctions in persons who suffer from acquired brain damage across the lifespan. Perceptual and cognitive dysfunctions after focal or diffuse cortical and subcortical lesions and/or in connection fiber tracts are discussed together with the neurocognitive assessment procedures that are commonly used to identify such deficits, including disorders of memory, praxis, language, visual spatial abilities, and executive functions. Students are introduced to the fields of Behavioral Neurology and Neuropsychology and will work on central questions such as: What do different neurological pathologies entailing functional and/or structural brain changes tell us about the brain-behavior relationship? The intended learning goals are: (1) acquisition of knowledge about the causes and neurobiological effects of acquired brain lesions, (2) acquaintance with the etiology and taxonomy of common neurological and neuropsychological syndromes, and (3) critical reflection of the consequences of brain lesions for diagnostics and treatment in clinical settings. This knowledge and reflection is essential for understanding the principles of neuropsychological rehabilitation, which can be used to support or even improve residual function after acquired brain damage and can ameliorate the life quality of neurological patients.

#### **Course objectives**

Students will be able to understand:

functional brain anatomy, cerebral vascularisation, neurophysiology of brain repair, neurological diseases, stroke, epilepsy, traumatic brain injury, alcohol-induced brain dysfunction, Korsakoff's disease, cognitive control, neuropsychological syndromes, brain plasticity, history of neuropsychology, neuropsychological assessment, cognitive rehabilitation.

#### **Prerequisites**

Bachelor's level knowledge of the hierarchical organisation of brain functions, basic brain anatomy and physiology.

PSY4407

Period 1

1 Sep 2020

23 Oct 2020

[Print course description](#)

ECTS credits:

4.0

Instruction language:

English

Coordinator:

- [S.A. Kotz](#)

Teaching methods:

Lecture(s), PBL

Assessment methods:

Attendance, Written exam

Keywords:

Neuroanatomy, neurology, history of neuropsychology, neuropsychology acquired brain dysfunction, brain injury, Neuropsychological assessment, rehabilitation, brain plasticity

Faculty of Psychology and Neuroscience

## Behavioural Disorders

### Full course description

The course covers the range of cognitive and behavioural problems that accompany the most common neuropsychiatric and neurological disorders (e.g. schizophrenia, ADHD, autism and acquired brain injuries). The course provides insight into the underlying neurobiological and psychological mechanisms, and it touches on the principle of vulnerability, and protective/risk factors in the aetiology of behavioural disorders.

### Course objectives

You will gain an understanding of the psychological, neurobiological, and epidemiological mechanisms underlying cognitive and biological models of developmental-, psychiatric-, and neurological disorders and neuropsychiatric syndromes.

PSY4408

Period 1

1 Sep 2020

23 Oct 2020

[Print course description](#)

ECTS credits:

4.0

Instruction language:

English

Coordinator:

- [M. Schwartze](#)

Teaching methods:

Lecture(s), PBL

Assessment methods:

Attendance, Written exam

Keywords:

behavioural disorders, cognitive and biological models, development, neuropsychiatry, acquired brain injury, Neuropsychology, intervention

Faculty of Psychology and Neuroscience

## Advanced Statistics I

### Full course description

The course consists of six units. In the first four units, participants will be given an in-depth training in the following standard statistical methods: factorial ANOVA for between-subject designs, analysis of covariance (ANCOVA), multivariate ANOVA (MANOVA), discriminant analysis and multiple linear regression. Students are assumed to have background knowledge of balanced two-way factorial ANOVA and multiple regression. These methods will be briefly reviewed. The following advanced topics will then be covered: unbalanced factorial designs, contrast analysis, interaction, simple slope analysis, dummy coding, centring covariates, different coding schemes, collinearity and residuals checks and data transformation. The distinction between confounders and mediators in regression and ANCOVA is also discussed, forming a bridge from regression to structural equations modelling (SEM). The latter is an advanced multivariate method that is gaining importance in psychology but still requires special software (such as Lisrel, EQS, AMOS or Mplus). SEM is introduced in two units, starting with causal modelling and mediation analysis in cross-sectional research and then extending to longitudinal research and latent variables (factors). Special attention is given to identifying models, model equivalence, global and local goodness of fit indices, parsimony, model modification and cross-validation. Some concepts from matrix algebra are needed for SEM, and these will be briefly discussed without going into technical detail.

### Course objectives

Students are able to understand:

oneway analysis of variance, contrast analysis, unbalanced designs, multivariate analysis of variance, discriminant analysis, linear regression with interaction terms, linear regression with dummy variables, data transformations, simple slope analysis, analysis of covariance, path analysis, structural equation modeling, confirmatory factor analysis, structural models with latent variables.

PSY4106

Period 1

1 Sep 2020

18 Dec 2020

[Print course description](#)

ECTS credits:

3.0

Instruction language:

English

Coordinator:

- [J. Schepers](#)

Teaching methods:

Assignment(s), Lecture(s), Skills, Training(s)

Assessment methods:

Attendance, Written exam

Keywords:

Univariate analysis of variance, multivariate analysis of variance, regression analysis, structural equation modeling

Faculty of Psychology and Neuroscience

## Practical Training: SPSS I and Lisrel

### Full course description

In order to make practical use of the statistical models that form the topic of the Advanced Statistics course, researchers must make use of statistical software. This course will utilise the traditional SPSS program, but also the specialised LISREL software. LISREL is a statistical program that allows structural equations models to be tested.

### Course objectives

Students are able to understand:

- defining contrasts;
- building regression models;
- doing multivariate analyses;
- transforming data;
- testing simple slopes;
- creating and testing SEM models.

PSY4119

Period 1

1 Sep 2020

18 Dec 2020

[Print course description](#)

ECTS credits:

0.0

Instruction language:

English

Coordinator:

- [J. Schepers](#)

Teaching methods:

Assignment(s), Training(s)

Assessment methods:

Attendance

Keywords:

SPSS, LISREL, statistical software

Faculty of Psychology and Neuroscience

# Basic Cognitive Psychological Skills

## Full course description

This course focuses on the acquisition and training of basic skills required in cognitive performance research. The course is centred around a psychological experiment in which students study the detrimental effects of arousal manipulation (environmental noise) on cognitive processing. Students will learn how to perform a field experiment and will undertake all the various stages that are necessary to acquire and analyse the data and report on the results. Students will be required to recruit a small number of subjects and to administer the test battery according to a pre-defined protocol. The test battery consists of paper and pencil tests that have been presented and discussed in previous courses. After data acquisition, a number of interactive sessions are planned in which students not only learn to explore and analyse their data with SPSS but also learn how to interpret the results. Students conclude the course by writing a journal style paper in APA format describing the experiment. Particular attention will be given to predicting and explaining the results within a theoretical perspective and comparing them with previous findings. An overview of the techniques and tests currently used to evaluate performance in a number of cognitive domains (such as language, perception, attention and executive functions), are also presented to students in this course.

## Course objectives

Students will be able to understand:

- psychological testing;
- data preparation;
- data analysis using multivariate techniques;
- report writing.

PSY4434

Period 1

1 Sep 2020

23 Oct 2020

[Print course description](#)

ECTS credits:

3.0

Instruction language:

English

Coordinator:

- E.B. de Sousa Fernandes Perna

Teaching methods:

Assignment(s), Lecture(s), Skills

Assessment methods:

Attendance, Final paper

Keywords:

Field experiment, applied behavioural testing, data reduction and analysis techniques, report writing

Faculty of Psychology and Neuroscience

## Arousal and Attention

### Full course description

This course familiarises students with key concepts and controversies in the study of effects of arousal and alertness on attention and cognitive performance, with an emphasis on the role of brain circuitry and neurotransmitters. It is known that human performance fluctuates depending on the state of alertness; when we are sleepy or tired, we are less attentive to events going on around us than when we are fully awake and alert. However, people who are extremely stressed or highly aroused can also have problems in effectively focussing or shifting their focus of attention (e.g. ADHD, anxiety disorders). The mechanisms underlying the relation between arousal, attention and performance have been the subject of extensive research in psychology. Therefore, this course will review current knowledge on subcortical arousal systems, attention networks and the neurobiology of sleep, in addition to a critical discussion of the classical Arousal Theory. Psychopharmacological studies will be presented that illustrate the role of different neurotransmitters in arousal and attention.

### Course objectives

Students will be able to understand:

arousal theory, inverted-U model, Yerkes-Dodson law, cognitive energetic model, additive factors method, Posner's attentional networks, orienting, Posner's cueing paradigm, Corbetta's model of attentional control, focused attention and the underlying neural mechanisms, alertness, sustained attention, vigilance, noradrenergic locus coeruleus activity, clonidine, signal detection theory, executive attention, prefrontal dopaminergic activity, Borbely's model of sleep regulation, caffeine, neurocognitive theory of insomnia, benzodiazepines, flip-flop mechanism of sleep-wake regulation, antihistamines.

PSY4409

Period 2

26 Oct 2020

18 Dec 2020

[Print course description](#)

ECTS credits:

4.0

Instruction language:

English

Coordinators:

- [T.W. Boonstra](#)
- P.R.A. Heckman

Teaching methods:

Lecture(s), PBL

Assessment methods:

Attendance, Written exam

Keywords:

Arousal, alertness, attention networks, brainstem arousal systems, sleep-wake regulation

Faculty of Psychology and Neuroscience

# Ageing

## Full course description

This course covers a broad range of topics in the field of cognitive development and ageing. The initial focus is on healthy ageing, to better understand processing changes that may arise in abnormal aging such as in neurodegeneration. Important questions covered will include: What is ageing? What neurobiological and cognitive mechanisms determine whether a person ages pathologically, normally, or successfully? Can the ageing process be influenced? To address these questions, students will critically reflect on influential theories, state-of-the-art research, established research methods, and clinical interventions. General themes are physical ageing, neural ageing, cognitive ageing, pathological ageing (mild cognitive impairment, dementia, Parkinson's disease), intervention strategies, and methodological issues in ageing research.

## Course objectives

Participants will obtain active understanding of:

Physical ageing, evolutionary theories of ageing, neural aging, amyloid cascade hypothesis, temporal lobe dysfunction, frontal lobe dysfunction, subcortical dysfunction, processing-speed theory, white matter decline, decline of cognitive control, inhibition deficit hypothesis, default-mode network dysfunction, parietal lobe dysfunction, mild cognitive impairment, Alzheimer's disease, vascular dementia and other types of dementia, Parkinson's disease, successful ageing, reserve theories, compensation and intervention, body/mind interventions in ageing and emotional ageing.

PSY4416

Period 2

26 Oct 2020

18 Dec 2020

[Print course description](#)

ECTS credits:

4.0

Instruction language:

English

Coordinator:

- M.P.J. van Boxtel

Teaching methods:

Lecture(s), PBL

Assessment methods:

Attendance, Written exam

Keywords:

physical, neural, Cognitive, and emotional ageing, dementia, Parkinson's disease, neurodegeneration, intervention

Faculty of Psychology and Neuroscience

## Neuropsychological Assessments

## Full course description

Neuropsychological assessment runs parallel to the courses Arousal and Attention and Ageing. The core elements in this skills training are the collection and interpretation of cognitive, emotional and behavioural data in order to support neurological or neuropsychiatric diagnosis. The skills training commences with an introductory lecture covering the principles and interpretation of neuropsychological assessment.

During a 7-week period, students are trained in neuropsychological history taking, observing patient behaviour, cognitive testing and interpreting cognitive and behavioural data. Finally, each student writes a comprehensive neuropsychological report based on a simulated clinical case.

## Course objectives

Students will obtain the basic skills of neuropsychological assessment, i.e. observing, interviewing, cognitive testing, combining and interpreting behavioural and cognitive data and neuropsychological report writing.

## Prerequisites

Introductory knowledge on psychodiagnostics and related psychometrics.

PSY4433

Period 2

26 Oct 2020

18 Dec 2020

[Print course description](#)

ECTS credits:

2.0

Instruction language:

English

Coordinator:

- M.G.F. Colombi

Teaching methods:

Assignment(s), Lecture(s), Paper(s), Patientcontact, Skills, Training(s), Work in subgroups

Assessment methods:

Attendance, Final paper

Keywords:

Neuropsychological assessment, cognitive disorders, brain disease, brain injury, test taking, interviewing, observations, psychometry

Faculty of Psychology and Neuroscience

## Biopsychology

### Full course description

This course provides an in-depth description of biopsychological concepts of brain function. It will cover elements from functional neuroanatomy, neurophysiology and psychopharmacology as they are applied to brain and behaviour research. The students will first review the macro- and

microanatomy of the brain, and also neurochemical and neurobiological mechanisms related to neurotransmission. Special attention will be paid to basic cellular processes leading to disturbances in the brain. The students will discuss questions such as: How do the chemicals in our brain influence neurons? How do they potentially affect the brain and leads to Alzheimer's disease? What is the specific role of second messengers in these processes? Additionally, the students will deal with sexual differentiation and which biological processes determine sexual or gender differences. In the fourth task the students will learn more about the neurobiological changes that lead to addiction.

## Course objectives

Students are able to:

- explain the basic mechanisms of neuronal communication within a neuron and between neurons;
- explain the principles and mechanisms of neurotransmission and receptor binding;
- explain the consequences of receptor activation (metabotropic or ionotropic) on intracellular events, i.e, second messenger signaling cascades;
- explain the biological factors that lead to sexual differentiation and which factors underlie gender identity.
- explain how addiction can be explained on basis of the biological changes in the mesolimbic system. The students will learn that dopamine and endorphins play an essential role. The students will learn the concepts of wanting and liking as different properties of addiction, each with a different neuronal substrate;
- write a short research proposal on a biological oriented topic of their choice;
- present a biological topic of their choice to a peer group in an understandable manner.

PSY4411

Period 3

4 Jan 2021

29 Jan 2021

[Print course description](#)

ECTS credits:

4.0

Instruction language:

English

Coordinator:

- [A. Sambeth](#)

Teaching methods:

Lecture(s), PBL, Presentation(s)

Assessment methods:

Attendance, Final paper, Presentation

Keywords:

action potentials, second messengers, neurotransmitters, depression, cognition, Alzheimer, neurogenesis

Faculty of Psychology and Neuroscience

## Neuroanatomy

## Full course description

The aim of this practical training is to make you acquainted with the neuroanatomical terminology and to gain insight into the spatial and functional organisation of the brain. It is essential to have a basic knowledge of the brain anatomy when working in the field of neuropsychology or neurobiology. Many specific brain areas can be linked to particular functions. Thus, knowledge of the brain anatomy and its main functions allows direct linkage of specific neurological or psychiatric disorders to particular brain areas. After a short theoretical introduction, you will study whole brains and brain material of mammals at both macroscopical (visual inspection) and microscopical level. The emphasis will be on major brain systems, including the basal ganglia and limbic system.

## Course objectives

Students are able to understand:

- organisation of the brain in particular the limbic system and basal ganglia;
- brain dissection;
- microscopical staining techniques.

PSY4108

Period 3

4 Jan 2021

29 Jan 2021

[Print course description](#)

ECTS credits:

1.0

Instruction language:

English

Coordinator:

- [J.H.H.J. Prickaerts](#)

Teaching methods:

Lecture(s), Skills, Work in subgroups

Assessment methods:

Attendance, Written exam

Keywords:

Neuroanatomy, limbic system, basal ganglia

Faculty of Psychology and Neuroscience

## Colloquia

### Full course description

Each specialisation organizes two colloquia, in which senior researchers from Maastricht University or visiting lecturers present their scientific insights. Each colloquium focuses in depth on one of a wide range of topics, with issues transcending the courses and specialisations. Each colloquium lecture will be followed by active discussion, chaired by the lecturer or the host of the guest lecturer. A total of twelve colloquia will be offered.

## Course objectives

Students are able to understand:

- key research domains from different specialisations;
- interdisciplinary research.

Students are able to interact with students from different specialisations.

PSY4100

Period 3

4 Jan 2021

2 Jul 2021

[Print course description](#)

ECTS credits:

1.0

Instruction language:

English

Coordinator:

- R. Schreiber

Teaching methods:

Lecture(s)

Assessment methods:

Attendance

Keywords:

interdisciplinary knowledge

Faculty of Psychology and Neuroscience

## Stress, the Brain and Depression

### Full course description

It has become increasingly clear that stress is one of the most important triggers for several cognitive-affective disorders. For instance, a tremendous amount of biological and cognitive-psychological research has been conducted on the onset and course of stress-related affective disorders like depression. Cognitively oriented psychologists have shown that the chance of developing stress-related depression is enhanced as a result of negative and dysfunctional (stress-inducing) thoughts, whereas biologically oriented psychologists and psychiatrists particularly emphasize the importance of biochemical brain dysfunction. Yet, despite intensive research over the past decades, unidirectional biological and cognitive achievements have not yet produced definitive conclusions about critical psychobiological risk factors involved in stress-related affective disorders like depression. In addition, and contrary to a one-dimensional approach, this course will concentrate on the interaction between stress and (genetic-) brain vulnerability in explaining susceptibility for stress-related affective disorders.

### Course objectives

Students will be able to understand:

- gene-brain mechanisms involved in stress;
- biochemistry of depression;
- interaction between genes, brain, stress and depression.

PSY4417

Period 4

1 Feb 2021

5 Mar 2021

[Print course description](#)

ECTS credits:

3.0

Instruction language:

English

Coordinator:

- [C.R. Markus](#)

Teaching methods:

Lecture(s), Paper(s), Presentation(s)

Assessment methods:

Attendance, Final paper

Keywords:

stress, genes, brain, depression, psychopharmacology

Faculty of Psychology and Neuroscience

## Executive Control

### Full course description

A key element in the current understanding of behavioural organisation is executive control. At present, a redefinition of related concepts and a rapid expansion of our knowledge are taking place, based on insights from cognitive neuroscience. Based on data from imaging studies, the behavioural and computational models of cognitive mechanisms are being restructured. Throughout the course, emphasis will be on mechanisms of control, such as motor control needed for movement, and cognitive control (or executive function) to bias the selection of action and thoughts to achieve our goals. Various experimental approaches are evaluated and discussed in the light of recent literature. Experts in the field of cognitive and motor control research will present their current work, and students will be able to discuss their own papers and topics with them.

### Course objectives

Students will be able to understand:

motor and cognitive control (executive functions) and brain structures involved in these types of control.

PSY4413

Period 4

8 Mar 2021

1 Apr 2021

[Print course description](#)

ECTS credits:

4.0

Instruction language:

English

Coordinator:

- [P. van Ruitenbeek](#)

Teaching methods:

Lecture(s), PBL, Presentation(s)

Assessment methods:

Attendance, Presentation, Written exam

Keywords:

motor control, Cognitive Control, executive functions

Faculty of Psychology and Neuroscience

## Advanced Statistics II

### Full course description

The course consists of seven units.

The first three units cover classical repeated measures ANOVA for the one- and two-way within-subject design and the split-plot (between x within) design. Special attention is given to: a) the choice between multivariate and univariate data formats and method of analysis, and the sphericity assumption; b) the distinction between the within-subjects and between-subjects part of a split-plot ANOVA, and how to obtain both using regression analysis; c) the surprising consequences of including covariates into repeated measures ANOVA; and d) the choice between different methods of analysis for randomised versus non-randomised group comparisons.

Subsequently, a further three units are devoted to mixed (multilevel) regression for nested designs and longitudinal studies. This mixed regression starts with a unit on marginal models for repeated measures as an alternative to repeated measures ANOVA in cases of missing data or within-subject covariates. Students are shown the pros and cons of various models for the correlational structure of repeated measures, such as compound symmetry and AR1. The second unit covers the random intercept model for repeated measures as a method to include individual effects in marginal models for longitudinal data (growth curves) or single trial analyses of lab data (response times, ERP, fMRI). Students learn how this can be combined with e.g. ARMA modelling to distinguish between interpersonal and intrapersonal outcome variation. The random intercept model will also be applied to a cluster randomised trial, i.e. an RCT where organisations like schools or companies instead of individuals are randomised. The third and last unit on mixed regression covers random slope models for longitudinal data (individual differences in change over time), single trial analysis (individual differences in stimulus effects) and multicentre trials (RCT within each of a number of organisations).

Finally, the topic of sample size and power calculations is introduced in a seventh unit.

### Course objectives

Students are able to understand:

## Research Master Cognitive and Clinical Neuroscience Specialisation Neuropsychology

- repeated measures ANOVA for within-subject and split-plot (between x within) designs, including factorial designs and covariates in repeated measures ANOVA;
- mixed (multilevel) linear regression with random effects and autocorrelation;
- sample size calculations for experimental and observational studies.

Specifically, students are able to choose the correct method of analysis, and specify a statistical model, for repeated measurements, to compare different models and choose the best model (based on checking assumptions, model fit and parsimony on top of plausibility), and to interpret effect estimates and significance tests obtained with that model.

Students are furthermore able to choose the correct formula for computing the sample size for basic and often used research designs, and to compute the sample size with that formula.

### Prerequisites

Good understanding of descriptive and inferential statistics at the elementary and intermediate level, including t-tests, factorial ANOVA and multiple linear regression. Skilled in the use of SPSS for statistical data analyses.

PSY4107

Period 4

1 Feb 2021

4 Jun 2021

[Print course description](#)

ECTS credits:

3.0

Instruction language:

English

Coordinator:

- [G.J.P. van Breukelen](#)

Teaching methods:

Assignment(s), Lecture(s), Training(s)

Assessment methods:

Attendance, Written exam

Keywords:

Within-subject designs, repeated measures ANOVA, mixed (multilevel) regression, marginal versus random effects models, sample size, power

Faculty of Psychology and Neuroscience

## Practical Training: SPSS II

### Full course description

This practical training forms part of the PSY4107 Advanced Statistics II course. The practical consists of seven sessions in the computer rooms. In the first six sessions SPSS procedures for repeated measures and multilevel data are practised. The goal is to understand how proper analyses of such data can be done using SPSS. In the last session GPower will be used to practice sample size (power) calculations for some elementary research designs.

## Course objectives

Students are able to understand and apply:

- how to run with SPSS: repeated measures ANOVA for within-subject and split-plot (between x within) designs, including factorial designs and covariates;
- how to run SPSS for: mixed (multilevel) linear regression with random effects and autocorrelation;
- how to use GPower for sample size (power) calculations for your own research (master thesis, grant application).

## Prerequisites

Good understanding of descriptive and inferential statistics at the elementary and intermediate level, including t-tests, factorial ANOVA and multiple linear regression. Skilled in the use of SPSS for statistical data analyses.

PSY4117

Period 4

1 Feb 2021

4 Jun 2021

[Print course description](#)

ECTS credits:

0.0

Instruction language:

English

Coordinator:

- [G.J.P. van Breukelen](#)

Teaching methods:

Training(s)

Assessment methods:

Attendance

Keywords:

Within-subject designs, repeated measures ANOVA, mixed (multilevel) regression, marginal versus random effects models, sample size, power, effect size

Faculty of Psychology and Neuroscience

## Human Neuroimaging

### Full course description

This course aims at introducing basic knowledge and principles of functional brain imaging techniques, with a special emphasis on their application in addressing clinically oriented research questions. The workshop comprises three sections.

The first section is a practical introduction into MRI image processing and statistical analysis, centering on functional MRI. During three meetings you will be working with real data, and become familiar with the following basic aspects of image analyses: the MR image and its preprocessing; First level statistical analysis (creating colored blobs); Second level analysis, with special emphasis

on between subject designs. Hands-on exercises will be complemented with easy introductory textbook chapters on the steps practiced in the exercises.

The second part of the workshop consists of more theoretical introductions to novel clinically relevant imaging techniques. In three education group meetings you will study at a deeper level some imaging topics that are thought basic for patient-oriented research. General topics that may be discussed include brain connectivity (structural, functional and effective connectivity), structural imaging techniques (voxel-based morphometry, cortical volume and thickness ...), and image analysis techniques (head motion correction, multivariate pattern analysis, independent component analysis...).

A third section comprises a group assignment. In a small group you get the opportunity to elaborate in more depth an imaging topic that has your interest. Each group will prepare a presentation in which they share their insight and understanding of this topic with the rest of the students.

## Course objectives

Students will be able to understand:

- functional brain imaging techniques and principles;
- hands-on data analysis;
- between group experimental designs;
- available imaging techniques for clinically oriented research.

## Prerequisites

Basic knowledge of brain anatomy, experimental design and statistics.

PSY4435

Period 4

1 Feb 2021

2 Apr 2021

[Print course description](#)

ECTS credits:

3.0

Instruction language:

English

Coordinators:

- [P. van Ruitenbeek](#)
- [T.W. Boonstra](#)

Teaching methods:

Lecture(s), Paper(s), Skills

Assessment methods:

Attendance, Assignment, Written exam

Keywords:

Magnetic Resonance Imaging (MRI), functional MRI, structural MRI, neuroimaging, data analysis, Brain connectivity

Faculty of Psychology and Neuroscience

## Neuropsychiatric Disorders

### Full course description

This course provides basic and advanced knowledge of neuropsychiatric disorders. Several neuropsychiatric disorders will be extensively discussed from a biopsychosocial perspective. In particular, the focus will be on new knowledge and developments within the neuropsychiatry, related to both research and clinical practice. The course covers main findings, biopsychosocial theories and controversies related to several neuropsychiatric disorders, with an emphasis on brain mechanisms and behavioural and cognitive dysfunction. The course discusses disorders at the interface between neuropsychiatry and cognitive/behavioural neurology. Each tutorial meeting covers another neuropsychiatric disorder, for example Gilles de la Tourette, pediatric delirium, ECT by depression, and anxiety disorders. Specific attention is given to neuropathology related to functional and structural brain imaging, neurochemistry as well as psychosocial factors. In short, this course deals with all major aspects of a number of specific neuropsychiatric disorders, including: biopsychosocial theories; neurobiological mechanisms; cognitive and behavioural implications; treatment and research. Students learn to integrate all the previously mentioned aspects of the disorders in order to increase their general knowledge of neuropsychiatry. The tutorial meetings will be led by renowned clinical experts in the field and will provide an excellent learning experience for students who want to focus on working within neuropsychiatry. Students also have to give a group presentation by themselves being related to a neuropsychiatric disorder, from a biopsychosocial perspective.

### Course objectives

- students are able to recognize neuropsychiatric disorders and related biopsychosocial models;
- students are able to identify different biopsychosocial (and cultural) factors being related to a specific neuropsychiatric disorder, and summarize these in a review;
- students are able to interpret the relationships of different factors, including neurobiologic mechanisms, gene environment interactions, behavioural and cognitive problems, neurotransmitters, and neuroimaging, being related to a specific neuropsychiatric disorder;
- students are able to write a review from a biopsychosocial perspective related to a specific neuropsychiatric disorder, including etiology, treatment, implications for clinical practice, and future perspectives.

PSY4414

Period 5

5 Apr 2021

4 Jun 2021

[Print course description](#)

ECTS credits:

3.0

Instruction language:

English

Coordinators:

- [I.H.G.B. Ramakers](#)
- W.J. Jansen

Teaching methods:

## **Neuropsychology in Practice: From Test Results to Report and Advice**

### **Full course description**

Students learn to integrate several aspects of a neuropsychological examination. This kind of examination can be used both in clinical settings and in clinical research and contains the following aspects: interview, clinical impression, test results, rating scales, questionnaires, etc. Learning to interpret and integrate the different aspects will result in a coherent neuropsychological report and conclusion. Tests and theoretical and practical knowledge will be presented in the current skills training to help students achieve the course goals. Note that the major focus of this skills training is not to test a patient or a subject participating in a study, but to interpret the data.

The skills training consists of eight meetings. In the first two meetings, an overview will be presented of the skills needed to form a conclusion about the data acquired by testing a patient or research subject. Furthermore, students will practise performing and interpreting tests, rating scales and questionnaires. The use of normative data, the concept of validity and what to do when a subject's performance is lower, or otherwise deviant from what would be expected, will also be addressed.

Meetings three to eight will be led by clinical experts. Video segments of different patients with a neuropsychological or psychiatric problem (e.g. patients from the departments of psychiatry, neurology and geriatrics) will form the basis of a group discussion and presentations, in which the emphasis will be on the interpretation of patient material.

### **Course objectives**

- students will practice performing neuropsychological tests, rating scales and questionnaires;
- students will be able to interpret test results and ratings on questionnaires;
- students will be able to translate theoretical knowledge on neuropsychological assessment to application in clinical practice.

PSY4423

Period 5

5 Apr 2021

4 Jun 2021

[Print course description](#)

ECTS credits:

2.0

Instruction language:

English

Coordinator:

- C.M. van Heugten

Teaching methods:

Assignment(s), Lecture(s), Presentation(s), Skills

Assessment methods:

Attendance, Presentation, Participation

Keywords:

clinical neuropsychology, assessment, cognitive dysfunctioning, emotional problems, behavioural problems

Faculty of Psychology and Neuroscience

## Neuropsychological Rehabilitation

### Full course description

The course will address the content of neuropsychological interventions as well as the procedures and designs that can be used for the execution of evidence-based research. Throughout the meetings, the basic premises and 'pitfalls' in this type of research will be elaborated and the possibilities to circumvent these problems by proper choice of approach and design will be discussed. Various research designs will be compared in terms of their strengths and weaknesses (e.g. experimental studies, quasi-experimental designs, intention-to-treat, single case designs, challenge-studies, depletion studies). Various forms of neuropsychological treatments will be discussed and students will receive practical training in rehabilitation principles. Skills will be developed that can be applied in cognitive training and psycho-education. Forms of complex behavioural treatment will also be discussed.

### Course objectives

- students will be able to explain the different neuropsychological treatment methods used in clinical practice;
- students can select and apply an adequate research design for the evaluation of the effects of neuropsychological treatment;
- students are able to design a randomized clinical trial to evaluate the effect of neuropsychological treatment.

PSY4424

Period 5

5 Apr 2021

4 Jun 2021

[Print course description](#)

ECTS credits:

2.0

Instruction language:

English

Coordinator:

- C.M. van Heugten

Teaching methods:

Assignment(s), Lecture(s), Presentation(s), Skills

Assessment methods:

Attendance, Participation, Presentation

Keywords:

rehabilitation, treatment, acquired brain damage, effectiveness

Faculty of Psychology and Neuroscience

## Neuropsychopharmacology

### Full course description

This course addresses the influence of drugs upon normal functioning and on disease states. Neurobiological and neurochemical mechanisms are presented with the aim to deepen insight into the various mechanisms of drug action. The course will review major classes of drugs that are used frequently in the treatment of mental disorders and neurological disease, but also other classes of drugs that have side effects on the central nervous system. Other topics in this course are behavioural toxicology, experimental designs used in treatment studies, drugs of abuse and recreational drugs.

### Course objectives

Students will be able to understand neurobiology of drugs and mental disorders.

PSY4415

Period 6

7 Jun 2021

2 Jul 2021

[Print course description](#)

ECTS credits:

3.0

Instruction language:

English

Coordinator:

- [J.G. Ramaekers](#)

Teaching methods:

PBL

Assessment methods:

Attendance, Final paper, Presentation

Keywords:

drug action, psychopharmacology of CNS disorders, behavioural toxicity

Faculty of Psychology and Neuroscience

## Psychopharmacology

### Full course description

Students will become acquainted with some current topics in psychopharmacology, i.e. mechanisms of medicinal drugs including new avenues, nutritional substances and substance use disorder.

## Research Master Cognitive and Clinical Neuroscience Specialisation Neuropsychology

There will be explicit attention to the different perspectives of Psychopharmacology from the tracks in which participating students are residing, ie. Neuropsychology (NP) and Psychopathology (PP).

Some research topics and perspectives in Psychopharmacology:

- Old drugs, new drugs or new targets?
- Animal Research or Human Research?
- Nutrition or Drug Treatment?
- Pills or Psychotherapy?

### Course objectives

- students are able to understand and remember principles of psychopharmacology and illustrate them using examples of psychopharmacological studies.
- students are able to create a presentation on a topic of psychopharmacology and present (apply) it professionally.

PSY4335

Period 6

7 Jun 2021

2 Jul 2021

[Print course description](#)

ECTS credits:

1.0

Instruction language:

English

Coordinator:

- [P. van Ruitenbeek](#)

Teaching methods:

Lecture(s), Presentation(s)

Assessment methods:

Attendance, Presentation

Keywords:

psychopharmacology

Faculty of Psychology and Neuroscience

## Psychiatric Epidemiology

### Full course description

The course provides an introduction to the methodologies and analytical strategies of epidemiology as applied to mental health outcomes. The principles and practice of various study types (cohort, case-control, RCT, ecological) will be taught, with emphasis on interpreting associations and possible causality thereof. Consideration will be given to such issues as confounding, bias, and moderation. Further topics to be covered include the use and interpretation of diagnostic studies, the basic principles of analysing dichotomous and time-to-event outcomes, genetic epidemiology, and the use of systematic reviews and meta-analysis for building cumulative knowledge.

## Course objectives

Students will be able to understand:

- different epidemiological study types, including their purpose, advantages and disadvantages;
- calculation and interpretation of effect size and outcome measures for dichotomous and time-to-event outcomes;
- principles of analysing epidemiological studies;
- genetic epidemiology;
- the basic steps of conducting a systematic review and meta-analysis.

PSY4371

Period 6

7 Jun 2021

2 Jul 2021

[Print course description](#)

ECTS credits:

1.0

Instruction language:

English

Coordinator:

- [W. Viechtbauer](#)

Teaching methods:

Assignment(s), Lecture(s), Skills, Training(s), Work in subgroups

Assessment methods:

Attendance, Final paper

Keywords:

Epidemiology, Methodology, statistics, experimental studies, observational studies, diagnostic studies, systematic reviews, meta-analysis

Faculty of Psychology and Neuroscience

## Research Grant Writing Workshop

### Full course description

Research is expensive. Finding appropriate funding sources and writing a convincing application is therefore a core competency of scientists. During this workshop students will learn why and how to apply for research grants. The need for acquiring funding for research, the opportunities for, and availability of grant application funding will be discussed. Students will start by choosing a topic (from a list of topics) and write an abstract on their research idea. Subsequently, they work in teams to discuss individual ideas and decide on a joint research idea that will serve as a basis for writing a full grant proposal during the second-year Research Grant Writing Course with guidance of a mentor (see description of PSY5112. Mentors are researchers from all RM tracks who have experience in applying for different types of grants will provide students with first-hand knowledge and tips. Students will learn fundamentals of good grant writing, general preparation of the grant application and how to deal with reviewer comments. Ethical issues including feasibility and acceptability of the research, and the role of the local research ethics committee will be discussed.

## Course objectives

- students will learn about the importance of grant writing for an academic career
- students will recognize opportunities for funding, ethical aspects of grants, how grants can be acquired, and grant writing skills;
- students will develop a first outline of a grant proposal with peers.

PSY4114

Period 6

7 Jun 2021

2 Jul 2021

[Print course description](#)

ECTS credits:

2.0

Instruction language:

English

Coordinators:

- [S. Köhler](#)
- [R.L.H. Handels](#)

Teaching methods:

Lecture(s), Skills, Assignment(s)

Assessment methods:

Final paper, Attendance

Keywords:

Funding possibilities, grant applications, proposal writing, team science

Second year courses

## Research Master Specialisation Neuropsychology year 2

Faculty of Psychology and Neuroscience

### Research Grant Writing Course

#### Full course description

Research is expensive. Finding appropriate funding sources and writing a convincing application is therefore a core competency of scientists. In this course, students will apply what they have learned during the Research Grant Writing Workshop (PSY4112) by going through a full grant proposal writing and review process. Students will work together (groups of 4-6 students) to write a research proposal on their selected topic, including an original research hypothesis, design, methods, motivation and valorization. Students are encouraged to think across boundaries of different scientific fields. A mentor (senior researcher) will guide students during this writing process. The students will write their proposal in 3 steps, and they will receive feedback from their mentor and peers along the way. The resulting grant proposals will be reviewed by two assessors and presented during a symposium by way of an oral presentation.

## Course objectives

Students are able to:

- review literature;
- formulate a research hypothesis;
- design a innovative research study;
- write a competitive grant proposal;
- present and illustrate a grant proposal at a symposium.

## Prerequisites

This course is a continuation of the Research Grant Writing Workshop (PSY4112).

PSY5112

Period 1

1 Sep 2020

23 Oct 2020

[Print course description](#)

ECTS credits:

3.0

Instruction language:

English

Coordinators:

- [S. Köhler](#)
- [R.L.H. Handels](#)

Teaching methods:

Work in subgroups, Skills, Assignment(s)

Assessment methods:

Attendance, Final paper, Presentation

Keywords:

grant proposal, Interdisciplinary, hypothesis, design, methods, research symposium

Faculty of Psychology and Neuroscience

## Cognitive Development

### Full course description

The focus of the course is on cognitive development during childhood and adolescence. Behavioral changes and underlying brain changes will be discussed. The aim is to learn more about scientific views on normal cognitive development and the methodological difficulties in demonstrating these views empirically. Although the focus is on normal development, development is often studied in the context of abnormal development. Examples of topics that are discussed during the course are general cognitive ability, executive function, brain maturation, cognitive stimulation and training, and cognitive vs socio-emotional development.

## Course objectives

Students will be able to:

- understand and critically evaluate theoretical and methodological issues in studies of cognitive development from childhood to adolescence;
- generate research ideas about and think about solutions to issues relevant in the field of cognitive development.

PSY5411

Period 1

1 Sep 2020

25 Sep 2020

[Print course description](#)

ECTS credits:

3.0

Instruction language:

English

Coordinator:

- [E.H.H. Keulers](#)

Teaching methods:

Work in subgroups, Presentations, Assignment(s)

Assessment methods:

Attendance, Final paper, Presentation

Keywords:

child neuropsychology, individual differences, cognitive development

Faculty of Psychology and Neuroscience

## Brain, Learning and Memory

### Full course description

There has been a rapid increase in our understanding of the basic mechanisms underlying the consolidation of new information and its subsequent retrieval. Both data from preclinical research in animal models and in preclinical human models and neuroimaging experiments will be used in this course, together with seminal experiments in patients. Recent theories and experimental data illustrate how a multidimensional view of learning and memory can help elucidate the relevant mechanisms in terms of neurobiology, neurochemistry and cognition. The influences of drugs on information processing and memory are also discussed in depth.

### Course objectives

- students are able to remember and understand the role of the hippocampus in memory functions, the role of other limbic structures in learning and memory, the role of neurotransmitters as drug targets in learning and memory;
- students are able to evaluate the use of various methods (e.g. lesions, animal models, cognitive tasks) in learning and memory research.

PSY5414

Period 1

28 Sep 2020

23 Oct 2020

[Print course description](#)

ECTS credits:

3.0

Instruction language:

English

Coordinator:

- [P. van Ruitenbeek](#)

Teaching methods:

Assignment(s), Lecture(s), Paper(s), Presentation(s), PBL

Assessment methods:

Attendance, Final paper

Keywords:

prefrontal cortex, hippocampus, limbic system, neurotransmitters, Working memory, short-term memory, long-term memory, acquisition, consolidation, retrieval, cognition enhancing drugs

Faculty of Psychology and Neuroscience

## Neuropsychological Assessment in Children

### Full course description

The aim of this workshop is to acquaint students with neuropsychological testing in children and with the interpretation of clinical data in relation to a conceptual model of brain-behaviour relationships. The constructs and assessment of cognitive functions in children will be discussed, with special attention given to methodological aspects of assessment. A number of cognitive tests for children will be presented during the workshop. Models of cognitive psychology will be considered in the context of developmental disorders, including memory, attention, information processing and intelligence. The focus is on test paradigms from the field of child neuropsychology used to probe domain-specific functions, with an emphasis on the need to integrate information from different sources: medical history, radiology, interview, test results, scientific literature, etc.

### Course objectives

Students will be able to:

- understand as well as critically evaluate concepts relevant for neuropsychological assessment (cognitive abilities), assessment methods and test results;
- analyse and interpret neuropsychological assessment data from patient with different syndromes/ difficulties;
- integrate different sources of information in answering diagnostic questions about patient cases and write a clinical report about this.

PSY5431

Period 1

1 Sep 2020

23 Oct 2020

[Print course description](#)

## Research Master Cognitive and Clinical Neuroscience Specialisation Neuropsychology

ECTS credits:

1.0

Instruction language:

English

Coordinator:

- [E.H.H. Keulers](#)

Teaching methods:

Assignment(s), Skills, Work in subgroups

Assessment methods:

Attendance, Final paper

Keywords:

Cognitive abilities, multiple disability, neuropediatrics, specific impairment, neuropsychological assessment/methods