ÖREBRO UNIVERSITET

Course syllabus
Third-cycle courses and study programmes

This is a translation of a Swedish document. In the event of a discrepancy, the Swedish-language version shall prevail.

Measures in the experimental lab: Behaviour, body & brain, 7,5 credits

Mätningar i det experimentella labbet: beteende, kropp och hjärna

Course Code/Codes	35PS065
Subject Area	Psychology
School/equivalent	School of Law, Psychology and Social work
Valid from	2018-10-08
Approved	2018-10-02
Revised	-
Approved by	Head of School
Translation to English, date and signature	Written in English

1 Course content

This course offers an introduction to various measures of the human mind that are commonly used in lab experiments in psychology and other behavioral sciences. The focus will be on behavioral measures as well as on measures of body and brain responses.

At a theoretical level, the students will explore the background of these measures and underlying mental processes, as well as how they can be used to address applied research questions. At a practical level, the students will gain experience with using these measures in a controlled lab environment and with analyzing the resulting quantitative data.

More specifically, the course includes three blocks:
1. Behavioral measures (e.g., response times, accuracy, and ratings).
2. Measures of peripheral nervous system (e.g., heart rate, skin conductance, and eye tracking).
3. Measures of central nervous system (e.g., EEG/ERPs, fMRI, and fNIRS).

2 Outcomes

2.1 The course in relation to the doctoral programme

The course shall primarily refer to the following intended learning outcomes for third-cycle courses and study programmes as described in the Higher Education Ordinance, i.e. the doctoral student shall demonstrate:

Knowledge and understanding
- broad knowledge and systematic understanding of the research field (part of outcome 1)
- familiarity with research methodology in general (part of outcome 2)

Competence and skills

- the ability to plan and use appropriate methods to undertake research and other qualified tasks within predetermined time frames (part of outcome 4)
- the ability to review and evaluate research and other qualified tasks (part of outcome 4)

Judgement and approach

- the ability to make assessments of research ethics (part of outcome 9)
- specialised insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used (outcome 10)

The intended learning outcomes are listed in the same order as in the general syllabus for the programme.

2.2 Intended course learning outcomes

To obtain a passing grade, the doctoral student shall demonstrate:

After the end of the course, the student shall be able to:

Knowledge and understanding
- Explain how measures covered by course work
- Exemplify how these measures can be applied in various areas of psychology or other behavioural science
- Describe how these measures are practically implemented
- Explain general principles for data analysis

Skills and abilities
After the end of the course, the student shall be able to:
- Adequately apply acquired theoretical and practical knowledge about measures covered by the course to their own research questions.

Analysis and evaluation
After the end of the course the student shall have advanced ability to:
- Evaluate and compare different measures covered by the course, taking into account the different types of information that they provide, and their possibilities and limitations.

3 Reading list and other teaching material

The following course readings and teaching material will be used on the course:

Block 1: Behavioral measures

Key words: Response time, accuracy, signal detection theory, attention, emotion, automaticity, explicit vs. implicit measures.

1. Hofmann, W., Gawronski, B., Gschwendner, T., Le, H., & Schmitt, M. (2005). A meta-analysis on the correlation between the Implicit Association Test and explicit self-report measures. Personality and Social Psychology Bulletin, 31(10), 1369-1385.
2. Jha, A. P., Krompinger, J., & Baime, M. J. (2007). Mindfulness training modifies subsystems of attention. Cognitive, Affective, & Behavioral Neuroscience, 7(2), 109-119.
3. Leotti, L. A., & Wager, T. D. (2010). Motivational influences on response inhibition measures. Journal of Experimental Psychology: Human Perception and Performance, 36(2), 430.
4. Tsoi, D. T., Lee, K. H., Khokhar, W. A., Mir, N. U., Swalli, J. S., Gee, K. A., ... & Woodruff, P. W. (2008). Is facial emotion recognition impairment in schizophrenia identical for different emotions? A signal detection analysis. Schizophrenia research, 99(1-3), 263-269.
5. Öhman, A., Flykt, A., & Esteves, F. (2001). Emotion drives attention: detecting the snake in the grass. Journal of experimental psychology: general, 130(3), 466.

Reference literature

1. Gawronski, B., & De Houwer, J. (2014). Implicit measures in social and personality psychology. In H. T. Reis, & C. M. Judd (Eds.), Handbook of research methods in social and personality psychology (2nd edition). New York, NY: Cambridge University Press.
2. Sternberg, S. (2004). Reaction-time experimentation. Psychology, 600, 301.

Block 2: Measures of peripheral nervous system

Key words: Autonomic, electrodermal, electromyography

1. Facial emotion recognition and eye movement behaviour in conduct disorder. J Child Psychol Psychiatry. 2018 Mar;59(3):247-257. doi: 10.1111/jcpp.12795. Epub 2017 Sep 7. Martin-Key NA, Graf EW, Adams WJ, Fairchild G.
2. Resting Heart Rate and the Development of Antisocial Behavior from Age 9-14: Genetic and Environmental Influences, Development and Psychopathology, (2009) 21(3):939-60, Laura A Baker, Catherine Tuvblad, Chandra Reynolds, Mo Zheng, Adrian Raine
3. Skin Conductance Fear Conditioning Impairments and Aggression: A Longitudinal Study, Yu Gao, Catherine Tuvblad, Anne Schell, Adrian Raine, Laura A Baker, Psychophysiology, (2014);52(2):288-95.
4. Genetic Covariance between Psychopathic Traits and Anticipatory Skin Conductance Responses to Threat: Evidence for a Potential Endophenotype, Pan Wang, Yu Gao, Josh Isen, Catherine Tuvblad, Adrian Raine, Laura A. Baker, Development and Psychopathology, (2015) 27(4 Pt 1):1313-22.
5. Fear conditioning and affective modulation of the startle reflex in male adolescents with early-onset or adolescence-onset conduct disorder and healthy control subjects. Biol Psychiatry. 2008 Feb 1;63(3):279-85. Epub 2007 Aug 31. Fairchild G, Van Goozen SH, Stollery SJ, Goodyer IM.
6. Association of poor childhood fear conditioning and adult crime. J Psychiatry. 2010 Jan;167(1):56-60. doi: 10.1176/appi.ajp.2009.09040499. Epub 2009 Nov 16. Gao Y, Raine A, Venables PH, Dawson ME, Mednick SA.

Reference literature:

1. Handbook of Psychophysiology 4th edition Edited by John T. Cacioppo, University of Chicago, Louis G. Tassinary, Texas A & M University , Gary G. Berntson, Ohio State University Online ISBN: 9781107415782
2. Psychophysiology: Human Behavior and Physiological Response (Psychophysiology: Human Behavior & Physiological Response (Paperback)) 5th Edition, Kindle Edition by John L. Andreassi (Author) ISBN-13: 978-0805849516

Block 3: Measures of central nervous system

Key words: ERPs, EEG, fMRI, resting-state, default-mode network, PET, fNIRS, meditation

1. Cahn, B. R., & Polich, J. (2009). Meditation (Vipassana) and the P3a event-related brain potential. International Journal of Psychophysiology, 72, 51-60.
2. Davidson, R. J. (2003). Alterations in Brain and Immune Function Produced by Mindfulness Meditation. Psychosomatic medicine, 65, 564-570.
3. Deepeshwar, S., Vinchurkar, S. A., Visweswaraiah, N. K., & Nagendra, H. R. (2015). Hemodynamic responses on prefrontal cortex related to meditation and attentional task. Neuroscience Letters, 8, 1-13.
4. Farb, A. S., Segal, Z. V., Mayberg, H., Bean, J., McKeon, D., Fatima, Z., & Anderson, A. K. (2007). Attention to the present: mindfulness meditation reveals distinct neural modes of self-reference. SCAN, 2, 313-322.
5. Gartenschläger, M., Schreckenberger, M., Buchholz, H.-G., Reiner, I., Beutel, M. E., Adler, J., & Michal, M. (2017). Resting brain activity related to dispositional mindfulness: a PET study. Mindfulness, 8, 1009-1017.
6. Jang, J. H., Jung, W. H., Kang, D.-H., Byun, M. S., Kwon, S. J., Choi, C.-H., & Kwon, J. S. (2010). Increased default mode network connectivity associated with meditation. Neuroscience Letters, 487, 358-362.

Reference literature:

1. Ward, J. (2006)/latest edition. The Student's Guide to Cognitive Neuroscience. East Sussex, UK: Psychology Press. This book covers both EEG/ERPs and functional imaging in an accessible way (two separate chapters)
2. Andreassi, J. L. (2007)/latest edition. Psychophysiology: Human Behavior and Physiological response. London, UK: Lawrence Erlbaum Associates. A more technical treatment of ERPs and EEG
3. Poldrack, R., Mumford, J. A., Nichols, T. E. (2011)/latest edition. Handbook of functional MRI data analysis. New York, NY: Cambridge University Press. A more technical treatment of fMRI with a focus on image processing.

4 Teaching formats

Teaching on the course takes the following format:

Each of the three blocks includes (1) an interactive seminar with assigned readings that aims at facilitating students' theoretical and practical understanding of the different measures, and (2) a lab practicum that aims at providing hands-on experience that will reinforce and supplement the knowledge taught during the preceding seminar.

Seminar 1	Theory and Measures of behavior
Lab practicum 1	Measures of behavior
Seminar 2	Theory and Measures of the peripheral nervous system
Lab practicum 2	Measures of the peripheral nervous system
Seminar 3	Theory and Measures of the **c**entral nervous system
Lab practicum 3	Measures of the central nervous system
Final seminar	Oral presentations of students' study proposals

Throughout the course, students are expected to integrate the course content with their own research area in applied psychology or other behavioral science.

Before each seminar, students are expected to read the assigned scientific papers, focusing on understanding the measurements used with the help of the reference literature.

The papers will be discussed at the seminars. Time at the seminars will also be spent on discussing how the measures can be used to address the students' own research questions.

5 Examination

The course is assessed through an examination consisting of the components listed below. The individual components are not graded separately but together they provide the basis for assessment and grading.

- A written research proposal on how to apply the measures to their own research question (including design ethics), submitted at the end of the course.

- An oral presentation and defence of the research proposal at the last seminar.

All seminars and lab practicum are mandatory. If more than one class is missed, the student is asked to write a summary of the readings for that meeting, including reflections (10-20 pages, Times New Roman, 12, double space).

6 Grades

Examinations on third-cycle courses and study programmes are to be assessed according to a two-grade scale with either of the grades ‘fail’ or ‘pass’ (local regulations).

The grade shall be determined by a teacher specifically nominated by the higher education institution (the examiner) (Higher Education Ordinance).

To obtain a passing grade on examinations included in the course, the doctoral student is required to demonstrate that he/she attains the intended course learning outcomes as described in section 2.2. Alternatively, if the course consists of multiple examinations generating credit, the doctoral student is required to demonstrate that he/she attains the outcomes that the examination in question refers to in accordance with section 5.

A student who has failed an examination is entitled to a retake.

If an examination consists of several examination components, and a student fails an examination component, the examiner may, as an alternative to a retake, set a make-up assignment with regard to the examination component in question.

A doctoral student who has failed an examination twice for a specific course or course element is entitled, upon his/her request, to have another examiner appointed to determine the grade.

7 Admission to the course

7.1 Admission requirements

To gain access to the course and complete the examinations included in the course, the applicant must be admitted to a doctoral programme at Örebro University.

7.2 Selection

Selection between applicants who have been admitted to doctoral programmes at Örebro University and who otherwise meet the admission requirements as listed above is made according to the following order of precedence:

If no other selection criteria are specified in this section, priority shall be given to applicants with a lower number of course credits left before the award of their degree over applicants with a higher number of remaining course credits. Should two or more students have equal number of credits, selection will be done through the drawing of lots. This also applies within any selection groups listed unless otherwise stated.

7.3 Other applicants than doctoral students admitted at Örebro University

Other applicants than doctoral students admitted at Örebro University may be given access to the course on the grounds of provisions for and/or agreements regarding contracted courses, joint degrees, national graduate schools or cooperation in other respects with other universities.

Any decisions on what such other applicants may be given access to the course are made separately and on the basis of the provisions and/or agreements that occasion the student to apply for the course.

For participation in the course in other respects, the same provisions shall apply as for doctoral students admitted to Örebro University.

8 Transfer of credits for courses, study programmes and other experience

Provisions on the transfer of credits can be found in the Higher Education Ordinance and on the university's webpage.

9 Other information

Transitional provisions
