EFEKTY UCZENIA SIĘ I TREŚCI PROGRAMOWE ZAJĘĆ

Study programme name: **Research in Cognitive Science**

Course name: **Problem Solving**
On successful completion of this course, a student
in terms of knowledge:
1. Is able to articulate contemporary theories of reasoning and problem-solving, demonstrating an understanding of cognitive science perspectives.
2. Is able to critically assess concepts of moral reasoning and rationality, applying these theories to analyze decision-making processes and their applications in various contexts.
in terms of skills:
1. Skilfully analyzes and applies reasoning processes to practical scenarios, particularly in moral reasoning and decision-making, demonstrating a thorough understanding of the underlying principles.
2. Can design and conduct empirical research on human reasoning and problem-solving, addressing methodological issues and effectively evaluating research findings.
in terms of social competences:
1. Can articulate complex concepts related to reasoning and problem-solving clearly and persuasively, fostering improved communication in academic and professional settings.
2. Is able to critically engage with diverse perspectives on reasoning and cognition, fostering open-mindedness and the ability to participate constructively in academic and interdisciplinary discussions.
Course learning content:
What is the University for?
Two system theories of cognitive processes.
Moral reasoning and decision-making.
Rationality.
Problem-solving: theory and practice.

Course name: **Academic Writing**
On successful completion of this course, a student
in terms of knowledge:
1. understands the ethical responsibilities of academic writing concerning citation, plagiarism, and fairness.
in terms of skills:
1. plans an academic work in English.
2. selects, uses, and refers to academic sources properly.
3. composes a coherent academic essay.
4. employs appropriate style and register in written work.
Course learning content:
Academic style and register
Punctuation, and sentence and paragraph structure
First language interference
Planning and executing
Structuring an argument
Introductions and conclusions
The use of sources and citations
The use of evidence
Forestalling rebuttals
Drafting and revising
The ethics of academic writing

Course name: **Empirical seminar 1**
On successful completion of this course, a student
in terms of knowledge:
1. The student understands the basic principles of presenting research results in poster form.
in terms of skills:
1. The student can develop a clear and concise poster presenting the results of their research.
in terms of social competences:

1. The students are ready to effectively present and discuss their research during a local conference for students using a poster.

Course learning content:

Preparation for scientific presentation and discussion

Course name: **Master's seminar 1**

On successful completion of this course, a student

in terms of knowledge:

1. is familiar with the software used for statistical data processing in the planned research.
2. is familiar with the results of research conducted in the planned research area.
3. knows and understands the research results from related areas of the planned research.

in terms of skills:

1. can define the area of their research interests.
2. can present fundamental research problems in their area of interest.
3. can prepare a written summary of a scientific text within their area of interest, considering the context of the subject literature.
4. can plan the procedure for conducting their research.

in terms of social competences:

1. is ready to expand their knowledge regarding the area of the planned thesis work.
2. is ready to accept feedback from the supervisor regarding the arrangement of variables and selected research tools, as well as their research procedure.
3. demonstrates sensitivity to the ethical aspects of the planned research.

Course learning content:

Defining the area of the student's research interests
Searching and selecting scientific sources
Principles of preparing scientific texts
Analysis of subject literature in the area of the student's research interests

Course name: **Master's laboratory 1**

On successful completion of this course, a student

in terms of knowledge:

1. knows how to conduct research and select scientific sources.
2. knows the basic principles of preparing scientific texts

in terms of skills:

1. can Independently define the area of their research interests.
2. can effectively conduct research and select scientific sources.
3. can prepare basic scientific texts.
4. can analyze and synthesize scientific literature related to their own research interests.

in terms of social competences:

1. is ready to independently conduct further research in the chosen area.
2. is ready to begin working on their own research project.

Course learning content:

Expansion of research skills.
Introduction to research ethics.

Course name: **Conceptual Foundations of Artificial Intelligence**

On successful completion of this course, a student

in terms of knowledge:

1. Names and characterises main AI research paradigms.
2. Knows historical context of AI concepts.

in terms of skills:

1. Characterises and evaluates arguments against AI.
2. Chacterises main assumptions of the computational mind theory and explains how this theory influences AI related research.
3. Reconstrues theoretical foundations and arguments of AI research on the basis of source texts and documents.

in terms of social competences:

1. Is aware of the role of historical and social context in discussions about AI.
2. Understand the complexity of the AI debate and the importance of the multidisciplinary approach to it.

Course learning content:
What is AI? History of the AI idea.
How to make AI idea come true? AI paradigms.
What does it mean to be intelligence. Weak and strong AI.
The computational mind theory. How does it influence AI and cognitive-science research.
Is this agent ingelligent? How one may say? The Turing test.
The Turing test and more. Chat-bots, human-computer interaction and natural language.
The Turing test and more. How to design better tests for thinking machines?
Philosophical and ethical arguments against AI.
Arguments against AI – the frame problem.
Arguments against AI – limitation theorems.

Course name: **Empirical seminar 2**
On successful completion of this course, a student
in terms of knowledge:
1. expands their knowledge about the standards of presenting research findings at scientific conferences.
in terms of skills:
1. The student is capable of developing a comprehensive and engaging poster or preparing a presentation at the PFK conference.
in terms of social competences:
1. The student is ready to effectively present their research in a clear and convincing manner to a broader audience.
Course learning content:
Preparation for scientific presentation and discussion

Course name: **Master's seminar 2**
On successful completion of this course, a student
in terms of knowledge:
1. is familiar with the software used for statistical data processing in the planned research.
2. is familiar with the results of research conducted in the planned research area.
3. knows and understands the research results from related areas of the planned research.
in terms of skills:
1. can identify the fundamental research problems addressed in the thesis.
2. can prepare a written summary of a scientific text within their area of interest, considering the context of the subject literature.
3. can present fundamental research problems in their area of interest.
in terms of social competences:
1. is ready to expand their knowledge regarding the area of the planned thesis work.
2. is ready to accept feedback from the supervisor regarding the arrangement of variables and selected research tools, as well as their research procedure
3. demonstrates sensitivity to the ethical aspects of the planned research.
Course learning content:
Analysis of subject literature in the area of the master's thesis problematics
Principles of preparing a review of a scientific text

Course name: **Master's laboratory 2**
On successful completion of this course, a student
in terms of knowledge:
1. knows how to analyze scientific literature in the area of their master's thesis problematics.
2. knows how to prepare literature reviews.
in terms of skills:
1. can critically evaluate and synthesize scientific literature related to the topic of their master's thesis.
2. can independently prepare literature reviews.
in terms of social competences:
1. is ready to conduct a more advanced analysis of scientific literature in the context of their master's thesis.
Course learning content:
Development of skills in analyzing subject literature.
Ethics in the context of writing a master's thesis.

Course name: **Behavioral & Cognitive Neuroscience**

On successful completion of this course, a student

in terms of knowledge:

1. Has a firm knowledge (in English) of the studied concepts / conceptions / theories, and about the relevant structure-function links for the cerebral cortex in norm and pathology.
2. Understands the links between behavioral and cognitive neuroscience, and other closely related research disciplines, such as neurophysiology, neuropharmacology, neuroanatomy, neuropathology, and neuropsychology.
3. Knows both basic and advanced research methods and postulated mechanisms / models of cerebral and mental functions related to the control of higher-order behavior and cognition.
4. Has advanced knowledge on the processes and mechanisms related to the control (or lack of thereof) of higher-order cognitive, tactile, linguistic, sexual, feeding, and emotional behavior.
5. Knows how to interpret and combine disparate research outcomes related to the studied discipline / research topics.
6. Understands the ethical guidelines, constraints for, and advantages vs. disadvantages of non-human vs. human research, and the required extensive ethical oversight in both cases.
7. Knows how to take care of her/his physical and mental health, at least in the domain of the studied topics.

in terms of skills:

1. Is capable of distinguishing between general ‘ideas’, specific ‘scientific concepts', related evidence-based theories, and their popular press portrayals, as well as their consequences (e.g., portrayal of prefrontal lobotomy in the popular press, vs. the real consequences of its application).
2. Can point to the main achievements of the behavioral and cognitive neuroscience as a separate discipline, including its ground-breaking experiments, explanatory concepts and theories, as well as their potential or real applications.
3. Can distinguish between good and bad research, ethical and (potentially) unethical research procedures, and should be capable of identifying scientific misconduct.
4. Is capable of differentiating between apparent and real contradictions in the studied research reports, and their consequences for general theories, and daily living.
5. Following considerations of or recommendations stemming from the studied research, can take care of her/his physical and mental health.

in terms of social competences:

1. Can publicly discuss advantages and disadvantages (pros and cons) of research on non-humans and humans.
2. Can argue in favour of valid (vs. dubious / questionable) research practices and their consequences for science and public health.
3. Should be able to comment to / advise younger students, peers, or family members on the general validity of a research approach and/or design, and its nature.
4. Can identify other dangers for her/his physical and mental health, and knows when and how to seek professional help (for her/his loved ones).

Course learning content:

Contemporary *Behavioral and Cognitive Neuroscience* (BCN) as a discipline at the crossroads of neurobiology, neuroscience, neuropsychology and experimental psychology. Achievements of BCN research, critical thinking, and scientific inference. Nonhuman and human subjects / participants, research, and its ethical oversight

Research methods in biopsychology, neurobiology, behavioral and cognitive neuroscience. Methods for visualizing, stimulating and recording psycho-physiological activity of the brain and its major functions. Advantages and disadvantages of the studied methods and research approaches

Functional Magnetic Resonance Imaging (fMRI), research safety, introduction to data acqusition, analyses, and visualization; MRI/fMRI research terminology/jargon

Somatosensory system: tactile and haptic processing. Cutaneous receptors, major somatosensory pathways, and the effects of damage to the related cortices and associated neural processing streams

Lateralization of basic behavioral and cognitive functions. Theories of the evolution of cerebral asymmetries. Left-hemisphere dominance for communication in humans and other species. Exceptions to classical accounts of interhemispheric and between hemispheric functional interrelationships

Hormones and sex, “sex” and “gender”, developmental and activational effects of sex hormones. Sex determination at conception vs. sexual development; bipotential precursor for the development of external reproductive structures. Gender identity and (sexual) preference from the neurobiological perspective

Hunger, eating, and related health issues. The basics of the control of eating, digestion, and energy metabolism. Hunger as a response to an energy need and an epidemic of eating disorders. Sham-eating tests and the insights on factors influencing how much we eat. The effects of diets on body weight and physiological research on hunger and satiety
Sleep, dreaming, and circadian rhythms. How much sleep do we need? Why do we sleep when we do, and how it affects stages of sleep? Dreaming, sleepwalking, and sleeptalking. The effects of sleep deprivation and sleep efficiency. Jet lag, shift work, and circadian clocks. Sleep disorders
Emotions, stress, and related health issues. Biopsychology of emotion: Introduction to classic and contemporary case studies, damage reconstruction methods, and theories of emotion. Lie detection as an emotion detection method; studying facial expressions; fear, defense, aggression, and testosterone. Neural mechanisms of fear conditioning. Stress and its impact on health
Drug addiction and the brain's reward circuits. Drug abuse and addiction as goal-directed behaviors. Basic principles of drug action, administration and absorption. Drug abuse, drug tolerance, withdrawal effects and physical dependence. Addiction: risk factors for compulsive drug use. Commonly abused drugs and the effects of long-term use. Biopsychology of addiction
Psychiatric disorders, disorders of thinking and mood; mood vs. anxiety disorders; antipsychotic drugs - their history and effectiveness. Epigenetic and/or environmental factors involved in mood and anxiety disorders; primary and secondary mood disorders, recurrence risk ratios, and possible therapies
Brain damage and cerebrovascular disorders, closed-head injuries, infections of the brain, and neurotoxins. Neuropsychological diseases and their animal models. Most common diseases and damage of the nervous system, and their current / prospective treatments
Recovery of brain functions: regeneration, reorganization, and neural prostheses

Course name: **Empirical seminar 3**
On successful completion of this course, a student
in terms of knowledge:
1. understands various formats for presenting research findings at different conferences.
in terms of skills:
1. can prepare a professional poster or presentation at any scientific conference.
in terms of social competences:
1. is prepared to adapt its presentation to different audiences and conference contexts, demonstrating advanced communication and presentation skills.
Course learning content:
Preparation for scientific presentation and discussion

Course name: **Master's seminar 3**
On successful completion of this course, a student
in terms of knowledge:
1. is familiar with the software used for statistical data processing in the planned research.
2. is familiar with the results of research conducted in the planned research area.
3. knows and understands the research results from related areas of the planned research.
in terms of skills:
1. can plan the procedure for conducting their research.
2. can present in detail the research problems of the master's thesis, taking into account the context of the subject literature.
3. can present in detail the methodology of their research.
in terms of social competences:
1. is ready to expand their knowledge regarding the area of the planned thesis work.
2. is ready to accept feedback from the supervisor regarding the arrangement of variables and selected research tools, as well as their research procedure.
3. demonstrates sensitivity to the ethical aspects of the planned research.
Course learning content:
Analysis of the research problems of the master's thesis in the context of subject literature.
Methodology of one's research.

Course name: **Master's laboratory 3**
On successful completion of this course, a student
in terms of knowledge:

1. knows basic research methodologies.

in terms of skills:

1. can contribute to scientific discussions by analyzing research problems in the context of literature.
2. can independently select and apply appropriate research methods.

in terms of social competences:

1. is ready to conduct their research within the framework of their master's thesis and develop a detailed research plan.

Course learning content:

Analysis of research problems in the context of subject literature.
Practical preparation for conducting research.

Course name: **Master's seminar 4**

On successful completion of this course, a student

in terms of knowledge:

1. is familiar with the software used for statistical data processing in the planned research.
2. is familiar with the results of research conducted in the planned research area.
3. knows and understands the research results from related areas of the planned research.

in terms of skills:

1. can present the results of their research.
2. can interpret the obtained results in the light of current research in the area of the master's thesis problematics.
3. can prepare a scientific text presenting the results of their research and their interpretation in the context of the subject literature.

in terms of social competences:

1. is ready to expand their knowledge regarding the area of the planned thesis work.
2. is ready to accept feedback from the supervisor regarding the arrangement of variables and selected research tools, as well as their research procedure.
3. demonstrates sensitivity to the ethical aspects of the planned research.

Course learning content:

Analysis and interpretation of the results of one's research in the context of the subject literature
Preparation of the final version of the master's thesis

Course name: **Master's laboratory 4**

On successful completion of this course, a student

in terms of knowledge:

1. knows how to prepare a scientific article.

in terms of skills:

1. can prepare a scientific article according to scientific requirements.

in terms of social competences:

1. is ready to continue their academic career or start professional work in their chosen field.

Course learning content:

Preparation of the final version of the master's thesis.