

SYLLABUS

1. Program details

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| 1. Higher education institution | West University of Timișoara |
| 1.2 Faculty / Department | Faculty of Psychology and Educational Sciences |
| 1.3 Department | Psychology |
| 1.4 Field of study | Psychology |
| 1.5 Cycle of studies | Bachelor's degree |
| 1.6 Study program / Qualification | Psychology-Cognitive Science |

2. Discipline details

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|---|---------------------------------------|--------------|---|------------------------|---|-----------------------|-------|
| 2.1 Discipline name | Logic and Scientific Reasoning | | | | | | |
| 2.2 Tenured teacher - course activities | Lecturer Octavian REPOLSCHI, Ph.D. | | | | | | |
| 2.3 Tenured teacher – seminar / laboratory activities | Lecturer Octavian REPOLSCHI, Ph.D. | | | | | | |
| 2.4 Study year | 1st | 2.5 Semester | 1 | 2.6 Type of assessment | E | 2.7 Discipline regime | DS/DO |
| 2.8 Google Classroom Code | zcovjmhs | | | | | | |

3. Estimated total time (hours per semester) of teaching activities

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| 3.1 Number of hours per week | 3 | Of which: 3.2 course | 1 | 3.3 seminar/laboratory | 2 |
| 3.4 Total hours from the curriculum | 42 | Of which: 3.5 course | 14 | 3.6 seminar/laboratory | 28 |
| Time fund distribution: | | | | | hours |
| Study based on the textbook, course material, bibliography, and notes | | | | | 24 |
| Additional documentation in the library, on specialist electronic platforms / in the field | | | | | 4 |
| Preparing seminars/labs, homework, papers, portfolios, and essays | | | | | 24 |
| Tutoring | | | | | 4 |

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| Examinations | 2 |
| Other activities | |
| 3.7 Total hours of individual study | 56 |
| 3.8 Total hours per semester | 100 |
| 3.9 Number of credits (ECTS) | 4 |

4. Prerequisites (where necessary)

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| 4.1 for curriculum | N/A |
| 4.2 for competencies | N/A |

5. Conditions (where necessary)

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| 5.1 for conducting the course | <ul style="list-style-type: none"> for face-to-face lectures: room with screen and video projector, laptop; for online lectures: laptop, internet access, access to Google Classroom, Google Meet, Google Forms; |
| 5.2 for conducting the seminar/laboratory | <ul style="list-style-type: none"> for face-to-face seminars: room with screen and video projector, laptop; for online seminars: laptop, internet access, access to Google Classroom, Google Meet, Google Forms; |

6. Discipline objectives - expected learning outcomes to which the discipline's study and promotion contributes

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| Knowledge | <ul style="list-style-type: none"> identifies and describes the fundamental concepts and types of argumentation identifies, analyzes and evaluates correctly the structures of argumentative texts; identifies and describes the concepts and fundamental elements of scientific reasoning |
| Skills | <ul style="list-style-type: none"> produces valid arguments using argumentation and scientific reasoning to find solutions to various scientific problems critically builds new solutions based on a given set of arguments and data formulates conclusions through analysis and logical evaluation to specific argumentative and/or scientific problems |

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| Responsibility and autonomy | <ul style="list-style-type: none"> • accepts and tolerates different points of view in the process of argumentation • supports different points of view using argumentation and scientific reasoning • responsibly expresses one's own points of view in an argumentative and/or a scientific context |
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7. Contents

| 7.1 Course | Teaching methods | Observations |
|---|----------------------|---|
| C1. Introduction to Logic and Scientific Reasoning. Reasoning and Argumentation: Deductive, Inductive and Abductive Reasoning. Identifying the structure of an argument. Evaluation of arguments: premises, conclusion, assumptions. Toulmin model. | Interactive lecture. | A pdf version of the lecture will be available on Classroom |
| C2. Deductive Reasoning. Propositional Logic. Syntax and Semantics of Propositional Logic. Validity and invalidity. | Interactive lecture. | A pdf version of the lecture will be available on Classroom |
| C3. Deductive Reasoning. Predicate Logic. Syntax and Semantics of Predicate Logic. Validity and invalidity. | Interactive lecture. | A pdf version of the lecture will be available on Classroom |
| C4. Inductive logic. Inductive Generalizations. Analogical Reasoning. Analogy and Similarity. Analysis and Evaluation. | Interactive lecture. | A pdf version of the lecture will be available on Classroom |
| C5. Statistical Reasoning. Logic and Statistics. Statistical Generalization. Correlation and Causality. Evaluating Correlations | Interactive lecture. | A pdf version of the lecture will be available on Classroom |
| C6. Explanation. Adequacy of Hypothesis. Testing Hypothesis. Plausability | Interactive lecture. | A pdf version of the lecture will be available on Classroom |
| C7. Scientific Reasoning. Probability. Elementary Probability Ideas. Conditional Probability. Bayes' Rule. The Bayesian Approach. | Interactive lecture. | A pdf version of the lecture will be available on Classroom |

References:

- Aliseda, Atocha. 2006. *Abductive Reasoning. Logical Investigations into Discovery and Explanation*. Dodrecht: Springer.
- Besnard, Philippe and Anthony Hunter. 2008. *Elements of Argumentation*. Cambridge, MA, London: The MIT Press.
- Boolos, G., J. Burgess, and R. Jeffrey. 2002. *Computability and Logic*. Cambridge: Cambridge University Press.
- Browne, M. Neil, and Stuart M. Keeley. 2007. *Asking the Right Questions. A Guide to Critical Thinking*. Eight Edition. Upper Saddle River, NJ: Paerson Prentice Hall.
- Cottrell, Stela. 2005. *Critical Thinking Skills. Developing Effective Analysis and Argumentation*. New York: Palgrave MacMillan.
- Eemeren, Frans H. van, Rob Grootendorst. 2004. *A Systematic Theory of Argumentation. A pragma-dialectical approach*. Cambridge, New York, Madrid, Cape Town, Singapore, São Paulo: Cambridge University Press.
- Hacking, Ian. 2001. *An Introduction to Probability and Inductive Logic*. New York: Cambridge University Press.
- Halpern, F. Diane. 2003. *Thought & Knowledge: An Introduction to Critical Thinking*. Mahwah, NJ, London: Lawrence Erlbaum Associates, Publishers.
- Howson, Colin and Peter Urbach. 2006. *Scientific Reasoning: The Bayesian Approach*. Third Edition. Chicago and La Salle, Illinois: Open Court.
- Hurley, J. Patrick, Lori Watson. 2018. *A Concise Introduction to Logic*. Thirteenth Edition. Australia, Brazil, Mexico, Singapore, United Kingdom, United States: Cengage Learning.
- Jaynes, E. T. 2003 *Probability Theory: The Logic of Science*. Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore, São Paulo: Cambridge University Press.
- Kelley, David. 2014. *The Art of Reasoning. An Introduction to Logic and Critical Thinking*. Fourth Edition. New York, London: W. W. Norton & Company , Inc.
- Pearl, Judea and Dana Mackenzie. 2020. *The Book of Why: The New Science of Cause and Effect*. New York: Basic Books.
- Schupbach, N. Jonah. 2022. *Bayesianism and Scientific Reasoning*. Cambridge: CUP.
- Sider, Theodore. 2010. *Logic for Philosophy..* New York: Oxford University Press.
- Toulmin, E. Stephen. 2003. *The Uses of Argument*. Updated Edition. Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore, São Paulo: Cambridge University Press.
- Toulmin, E. Stephen, Richard Rieke, and Allan Janik. 1984. *An Introduction to Reasoning*. Second Edition. New York: Macmillan Publishing Co., Ind., London: Collier Macmillan Publishers.
- Walton, Douglas. 2004. *Relevance in Argumentation*. Mahwah, NJ, London: Lawrence Erlbaum Associates, Publishers.
- Walton, Douglas. 2006. *Fundamentals of Critical Argumentation*. Cambridge, New York, Madrid, Cape Town, Singapore, São Paulo: Cambridge University Press.
- Walton, Douglas. 2008. *Informal Logic. A Pragmatic Approach*. Second Edition. New York: Cambridge University Press.
- Weston, Anthony. 2017. *A Rulebook for Arguments*. Fifth Edition. Indianapolis/Cambridge Hackett Publishing Company.

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| 7.2 Seminar / laboratory | Teaching methods | Observations |
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| S1-2. Performing an initial test for evaluating critical reasoning abilities; checking the way to solve the critical reasoning problems using IAGen; identifying the structure of an argument. Evaluation of arguments: premises, conclusion, assumptions. Toulmin model. Applications. | Discussions on the theoretical aspects of argumentation. Applications: identifying the structure of arguments; analyzing arguments. Representation of arguments using Diagrams and Toulmin model. Discussions concerning the solutions proposed by IAGen for different types of arguments given in the critical reasoning test. | - |
| S3-4. Propositional Logic. Applications. | Discussions on the theoretical aspects of propositional logic. Applications: testing arguments for validity; fallacies | - |
| S5-6. Predicate Logic. Applications. | Discussions on the theoretical aspects of propositional logic. Applications: rules of inference; validity and invalidity; fallacies | - |
| S7-8. Inductive Generalizations. Analogical Reasoning. Applications. | Discussions on the theoretical aspects of inductive reasoning. Applications: analyzing arguments from analogy | - |
| S9-10. Statistical Reasoning. Correlation and Causality. Applications. | Discussions on the theoretical aspects of statistical reasoning. Applications: evaluating statistics and correlations; | - |
| S11-12. Explanation. Testing Hypothesis. Applications. | Discussions on the theoretical aspects of Explanation and Hypothesis. Applications: testing hypothesis | - |
| S13-14. Probability. Bayes' Rule and Bayesianism. Applications. | Discussions on the theoretical aspects of probability. Applications: elements of probability, Bayes' rule, testing hypothesis and learning from experience | - |

References:

- Hacking, Ian. 2001. *An Introduction to Probability and Inductive Logic*. New York: Cambridge University Press.
- Browne, M. Neil, and Stuart M. Keeley. 2007. *Asking the Right Questions. A Guide to Critical Thinking*. Eight Edition. Upper Saddle River, NJ: Paerson Prentice Hall.
- Cottrell, Stela. 2005. *Critical Thinking Skills. Developing Effective Analysis and Argumentation*. New York: Palgrave MacMillan.
- Howson, Colin and Peter Urbach. 2006. *Scientific Reasoning: The Bayesian Approach*. Third Edition. Chicago and La Salle, Illinois: Open Court.
- Hurley, J. Patrick, Lori Watson. 2018. *A Concise Introduction to Logic*. Thirteenth Edition. Australia, Brazil, Mexico, Singapore, United Kingdom, United States: Cengage Learning.
- Jaynes, E. T. 2003 *Probability Theory: The Logic of Science*. Cambridge, New York, Melbourne, Madrid, Cape Town, Singapore, São Paulo: Cambridge University Press.
- Kelley, David. 2014. *The Art of Reasoning. An Introduction to Logic and Critical Thinking*. Fourth Edition. New York, London: W. W. Norton & Company , Inc.
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- Sider, Theodore. 2010. *Logic for Philosophy..* New York: Oxford University Press.
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- Walton, Douglas. 2006. *Fundamentals of Critical Argumentation*. Cambridge, New York, Madrid, Cape Town, Singapore, São Paulo: Cambridge University Press.
- Weston, Anthony. 2017. *A Rulebook for Arguments*. Fifth Edition. Indianapolis/Cambridge Hackett Publishing Company.

8. Correlation of discipline contents with the expectations of the representatives of the epistemic community, professional associations and representative employers in the field related to the program

The content of the course is compatible with the content of the similar courses in undergraduate Cognitive Science programs taught at University of Bucharest, Babeș-Bolyai University, The University of Edinburg and with the expectations of the epistemic community.

9. Assessment

| Activity type | 9.1 Assessment criteria | 9.2 Assessment methods | 9.3 Weight of final mark |
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| 9.4 Course | <ul style="list-style-type: none"> • knowledge and understanding of the fundamental concepts and theories of argumentation — deductive reasoning • proper application of the basic knowledge of argumentation - deductive reasoning | Midterm exam | 25% |
| | <ul style="list-style-type: none"> • knowledge and understanding of the fundamental concepts and theories of argumentation — inductive reasoning • proper application of the basic knowledge of argumentation - inductive reasoning, scientific reasoning | Final exam | 40% |
| 9.5 Seminar / laboratory | Problem solving in seminar classes | Assignments and quizzes | 25% |
| | Discussions and active participation in seminars | Class participation | 10% |
| 9.6 Minimum performance standard | | | |
| <p>The final grade is computed with the following formula: 25% Midterm Exam + 40% Final Exam + 25% Assignments and Quizzes + 10% Class participation. In order to be promoted, the final grade should be at least 5 (five). The Midterm exam grade should be at least 5 (five). The exams that were not passed, will be taken in the same conditions as in the first presentation. In order to participate in the final examination any student must have obtained at least 5 (five) for the Seminar. To increase the grade, an exam is given from all courses and seminar applications.</p> <p>Attendance: the minimum required for Lectures is 50% out of the total number in the semester; the minimum required for Seminar is 70% out of the total number in the semester; the student that will not meet the minimum attendance required for one of both type of classes, will have to solve supplementary assignments.</p> <p>If those minimum requirements concerning the attendance and the minimum grade for the seminar are not met by the end of the semester, the student must enroll again for the course in the next academic year.</p> | | | |

Date of completion:
12.09.2025

Tenure teacher:
Octavian REPOLACHI, Ph.D.
Lecturer

Date of approval in the department

Head of Department:
Delia VIRGĂ, Ph.D.
Professor