About the Logic and Reasoning Institute
The Logic and Reasoning minor is an initiative of JMU’s Logic and Reasoning Institute (LRI), which sponsors and encourages logic-related coursework in departments across the university. The LRI promotes interdisciplinary research in logic, its application and its pedagogy, and emphasizes the philosophical foundations of logic and reasoning in and across disciplines.

Faculty
The minor in Logic and Reasoning fosters interdisciplinary cooperation among scholars in participating departments. The faculty members involved in the minor are:

- Thomas Adajian, Department of Philosophy and Religion
- Elizabeth Brown, Department of Mathematics and Statistics
- Sharon Cote, Department of English (Linguistics)
- Kethera Fogler, Department of Graduate Psychology
- Christopher Fox, Department of Computer Science
- Jeffrey Goodman, Department of Philosophy and Religion
- Ralph Grove, Department of Computer Science
- Brant Jones, Department of Mathematics and Statistics
- William Knorpp, Department of Philosophy and Religion
- Tracy Lupher, Department of Philosophy and Religion
- Ramon Mata-Toledo, Department of Computer Science
- Edwin O’Shea, Department of Mathematics and Statistics
- Christopher Runyon, Department of Philosophy and Religion
- Jim Sochaki, Department of Mathematics and Statistics
- Nathan Sprague, Department of Computer Science
- Laura Taalman, Department of Mathematics and Statistics
Logic and Reasoning Minor

The Logic and Reasoning Minor brings together several disciplines – philosophy, mathematics, computer science – that take logic as part of their subject matter, as well as part of their method. The minor emphasizes the core logical elements that are common across disciplines and shows how to apply these common logical concepts and tools in different domains. Graduate schools and employers seek candidates with above-average training in logic and reasoning. This minor supplies such training.

Requirements

The requirement for a minor in Logic and Reasoning is 18 to 19 credits with 12 to 13 credit hours from a set of core courses and 6 credit hours from electives.

<table>
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<tr>
<th>Courses</th>
<th>Credit Hours</th>
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<tr>
<td><strong>Required Courses:</strong></td>
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<tr>
<td>PHIL 250 Introduction to Symbolic Logic</td>
<td>3 credits</td>
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<tr>
<td>PHIL 310 Intermediate Symbolic Logic</td>
<td>3 credits</td>
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<tr>
<td>MATH 235 Calculus I.</td>
<td>4 credits</td>
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<tr>
<td>MATH 245 Discrete Mathematics</td>
<td>3 credits</td>
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<tr>
<td>MATH/CS 227 Discrete Mathematics I.</td>
<td>3 credits</td>
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<tr>
<td>MATH/CS 228 Discrete Mathematics II.</td>
<td>3 credits</td>
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<td><strong>Elective Courses:</strong></td>
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<td>PHIL 315 Logic and Legal Reasoning.</td>
<td>3 credits</td>
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<td>PHIL 320 Inductive Logic.</td>
<td>3 credits</td>
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<td>PHIL 396 Philosophy of Physics.</td>
<td>3 credits</td>
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<td>PHIL 397 Philosophy of Space and Time.</td>
<td>3 credits</td>
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<td>PHIL 398 Philosophy of Quantum Theory.</td>
<td>3 credits</td>
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<tr>
<td>PHIL 410 Philosophy of Science.</td>
<td>3 credits</td>
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<tr>
<td>MATH 424 Statistical Decision Theory.</td>
<td>3 credits</td>
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Elective Courses: Choose at least two of the following:

**CS 444. Artificial Intelligence ..................3 credits (prerequisite CS 240)**
This course surveys the history, goals, social impact, philosophical implications and techniques used to try to make computers intelligent. Logic has played a central role in this field since its inception

**MATH 424. Statistical Decision Theory ..........3 credits (prerequisite MATH 318)**
This course surveys the development and use of probability and statistics for strategic decision making with applications. Topics include decision flow diagrams, analysis of risk and risk aversion, utility theory, Bayesian statistical methods, the economics of sampling, sensitivity analysis and collective decision making.

**PHIL 315. Logic and Legal Reasoning. ..........3 credits**
This course examines legal writings of different kinds, all of which involve reasoning. Symbolic logic is an invaluable tool for the analysis of legal reasoning.

**PHIL 320. Inductive Logic. .......................3 credits**
This course surveys some of the tools and philosophical issues central to inductive logic. Topics may include the philosophical justification of induction, the probability calculus, philosophical theories of probability, issues in the foundations of statistical inference and expected utility theory.

**PHIL 396. Philosophy of Physics ..................3 credits (prerequisite PHIL 101)**
This course examines arguments about the nature of space and time, special relativity, general relativity, quantum theory, classical mechanics, thermodynamics and/or cosmology. The role of paraconsistent logics in the analysis of time and motion examined as well as quantum logic.

**PHIL 397. Philosophy of Space and Time. .......3 credits**
This course surveys debates about the nature of space and time. Topics may include Zeno's paradoxes, time travel, relationism vs. substantivalism, classical accounts of space and time, and relativistic spacetime. The role of paraconsistent logics in the analysis of time and motion is examined.

**PHIL 398. Philosophy of Quantum Theory.........3 credits**
Quantum theory describes atoms and particles and is one of the most empirically successful physical theories. However, quantum theory seems to have revolutionary conceptual implications for metaphysics, epistemology and quantum logic. Some have argued that quantum physics shows that the laws of logic can be revised.

**PHIL 410. Philosophy of Science..................3 credits**
This course surveys a number of topics about the nature of science. The topics may include the problem of distinguishing science from pseudo-science, the nature of scientific explanation, the notion of progress in science, and the realism and anti-realism debate.

Total ........................................ 18–19 credits