**Knowledge Representation**

**Overview**

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| Level | 4 (Semester 7) |
| Duration | 4 weeks |
| Lectures | 10x40 minutes/week for 2 weeks |
| Practicals/tutorials | 5x2 hours/week for 3 weeks |

**Learning Outcomes**

1. Students will demonstrate mastery of core principles and concepts of knowledge-based systems.
2. Students will develop the ability to think analytically and creatively about knowledge-based systems.
3. Students will demonstrate the ability to apply relevant formal and semi-formal modelling techniques, and to perform relevant calculations.
4. Students will demonstrate an ability to perform an in-depth knowledge representation analysis of a domain and application, and an ability to communicate the results effectively at an appropriate level of technical depth.

**Syllabus**

* Introduction to KRR, logic-based and rule-based systems
* Logical Agents: Rationality, PEAS representation, formal language of propositions
* Logical Agents 2: Logic, models, and entailment
* Logical Agents 3: Proof search, resolution, forward-chaining, backward-chaining
* Reasoning under Uncertainty: Probability and Fuzzy logic
* Decision-tree and Concept Learning
* Ontologies and semantic networks
* The Semantic Web and Description Logic
* Knowledge engineering: expertise identification, capture, evaluations, reusability.