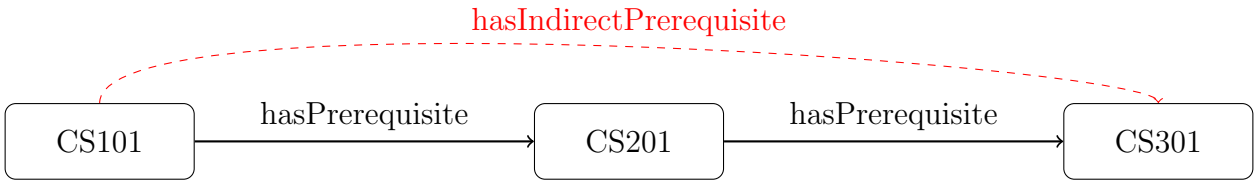
University Courses Ontology : Utility of Property Chains in Curriculum Planning

Slim Hassen & Khalifa Abdallah

Property chains play a crucial role in ontology-based curriculum planning by enabling the inference of indirect relationships between courses. In a university setting, courses often have prerequisites, and understanding not only direct prerequisites but also chains of prerequisites is essential for academic planning. For example, if Course A is a prerequisite of Course B, and Course B is a prerequisite of Course C, a property chain allows the ontology to infer that Course A is an *indirect prerequisite* of Course C. This facilitates automated reasoning about which courses a student can enroll in based on their completed coursework, avoiding manual checks and potential errors.



By modeling such chains in the ontology, planners and academic advisors can identify dependencies, ensure that students meet all necessary prerequisites, and prevent scheduling conflicts. Moreover, property chains help define advanced concepts, such as *Advanced Courses*, which require multiple levels of prior knowledge. Inference over these chains allows the reasoner to automatically classify courses and students' eligibility, enhancing both efficiency and accuracy in curriculum management. Consequently, ontology-based reasoning with property chains provides a robust framework for structured, logical, and dynamic curriculum planning in higher education.