

**STUDENT CLUSTERING AND PREREQUISITE CONCEPT  
REQUIREMENT MAPPING USING A ROUGH SET BASED  
GRANULAR CONCEPT HIERARCHY**



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**STUDENT CLUSTERING AND PREREQUISITE CONCEPT REQUIREMENT  
MAPPING USING A ROUGH SET BASED GRANULAR CONCEPT HIERARCHY****SUMALEE SONAMTHIANG 4637886 ILSE/D****Ph.D. (SCIENCE AND TECHNOLOGY EDUCATION)****THESIS ADVISORY COMMITTEE: KANLAYA NARUEDOMKUL, Ph.D.  
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The lack of proper prior knowledge affects students' ability to learn a new concept. Therefore, teachers need to know the student's prior knowledge before designing the instruction plan that best suits each student. Unfortunately, determining the prior knowledge of individual students is time consuming. In addition, designing and implementing the instruction plans to serve individual students with different prior knowledge is quite difficult. In this thesis, we propose the approach to group the students based on their similar prior knowledges and if their prior knowledge is inadequate, then the required prerequisite concept will be mapped to each student. We designed and developed a student clustering and prerequisite concept requirement mapping tool called RoughClust. RoughClust applied a rough set-based granular concept hierarchy (GCH) and domain dependency in clustering the students' pretest data. Then, the group's characteristics were used as criteria to map the students to the groups' prerequisite concept requirement. RoughClust can also provide the teachers with instructional materials for convenient use in teaching. RoughClust was evaluated for its clustering accuracy, coverage, and user satisfaction. The evaluation results showed that RoughClust provides acceptable accuracy and coverage, and satisfies the users' needs. Moreover, the teachers expressed the desire to use RoughClust in instruction planning.

**KEY WORDS: GRANULAR CONCEPT HIERARCHY/ ROUH SETS/ STUDENT  
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