

Faculty	Science
School	School of Mathematics and Physics
Activity	Flipped Classroom
Lead	Dr Barbara Maenhaut
Course	MATH1061 Discrete Mathematics
Average no. of students	300-400

The course

- This course provides an introduction to the areas of mathematics that involve mathematical structures that are discrete rather than continuous. Topics include propositional and predicate logic, methods of proof, number theory, set theory, relations and functions, methods of counting, and graph theory. These areas of mathematics are particularly relevant to computer science.

Flexible and Active elements

- During 2016 the team (Darryn Bryant, Ben Burton, Sara Herke, Barbara Maenhaut) re-developed the course material for MATH1061 to allow it to be presented using active learning techniques. With the support of a Faculty of Science teaching grant, 46 videos (approximately 10 minutes each) were created that cover the core concepts of MATH1061.
- Students prepare for each class by watching one or two videos and completing an online quiz. The results of the quiz are reviewed by the lecturing staff prior to the lecture. In class, lecturing staff answer questions raised in the quiz feedback, and the students work through problems to deepen their understanding of the course material.
- In-class problems include a mixture of clicker questions which are used as part of whole class discussions, and lengthier problems which students work on in small groups or individually with guidance from the 3 staff members circulating in the room.

Learning outcomes

- Student feedback on the active learning presentation of the course was overwhelmingly positive.
- A comparison of performance on exam questions from previous semesters indicates that students learned more, and the failure rate decreased by approximately 5% as compared to the Semester 2 2015 cohort.

“ What the students say

The videos and pre-quizzes were great. Coming to class, I always felt prepared and up-to-date with the course material - I learn best by doing, so the fact that the course essentially consisted of 4 tutorial sessions per week really helped me!

I cannot emphasise how useful the pre-lecture videos were. Combining those with assessed pre-class quizzes to ensure we stayed up to date with the content is an excellent idea.

The opportunity to apply concepts in the lectures through the activities was definitely helpful, especially considering it was possible to discuss the problems with the students around you.

The materials were presented in a clear, logical manner, and the online videos made understanding the intent of the pre-readings far easier than just being assigned equivalent readings from textbooks (which are often dense and difficult to grasp). The use of lectures for practical work on problems was excellent, and provided a great opportunity to prepare for the problems presented in tutorials.”