

( —; 3-0-0)

## Mathematics with a Historical Perspective

MATH-381\*

This course is suitable for all students in a MATH Honours programme. It is one of the courses in the department's Teaching Focus.

**Textbook:** *Journey Through Genius – The Great Theorems of Mathematics*  
by William Dunham (John Wiley & Sons, 1990)

**Prerequisite:** MATH 120 *or* 121 *or* 126; MATH 110 *or* 111 *or* 112\*; ready access to high school mathematics.

**Instructor:** M. Orzech

<b>Evaluation:</b>	Homework and Class Activities	30%
	Report (can be joint)	30%
	Final Examination (model provided)	40%

### Course Description:

The progress of this course is guided by the text, *Journey Through Genius* by W. Dunham. The book has twelve chapters. The  $n^{\text{th}}$  week of classes is generally based on the  $n^{\text{th}}$  chapter, but class activities and presentations introduce other material connected mathematically or historically to Dunham's exposition. Students are expected to read each chapter prior to the week when it is treated, and to attend classes and participate in activities.

The formal course prerequisites include courses in single-variable differential and integral calculus and in linear algebra, and ability to recall or reconstruct high school mathematics. Calculus is called on more than linear algebra. The latter prerequisite is there to ensure an interest in mathematics, and prior exposure to mathematical areas and modes of thought preparatory for the scope and intellectual character of a third year mathematics course. Proof is an important element of the course. Since Dunham's book is written for non-specialists, a good deal of the course work depends on high-school mathematics, and students need access to that material, usually with a more sophisticated and flexible perspective than in high school. An attempt will be made to find an assistant who can help with high school mathematics that students have forgotten or missed.

The course structure recognizes that this is a course in the Teaching Focus of the Math Major programme. One aspect of this recognition is the requirement of a report done as an independent study. Another aspect of this recognition involves consideration of pedagogical issues as we reflect on how mathematics developed. The Teaching Focus orientation is also behind involving students in short two-person presentations on high-school oriented mathematical issues connected with the readings and lectures. About one class per week will be devoted to these presentations.

The report will be a paper developed along the lines of a chapter in Dunham's book. The centrepiece will be a mathematical idea, method, or theorem explained in (mathematical) detail, with historical background provided in an introductory section, and an epilogue telling about developments that followed from the mathematics presented in the main part of the paper.