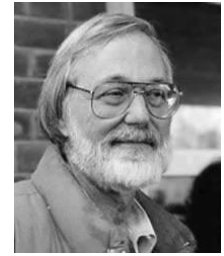




J. Tate



J. Milnor

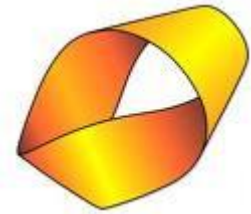
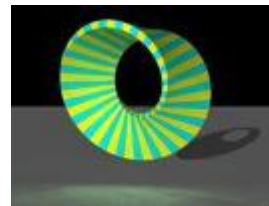
THE UNIVERSITY OF WESTERN ONTARIO  
LONDON CANADA  
DEPARTMENT OF MATHEMATICS

**Milnor K-Theory - Mathematics 9413a**

Fall 2011

**Instructor:** Ján Mináč  
**E-mail:** [minac@uwo.ca](mailto:minac@uwo.ca) and [jminac1811@gmail.com](mailto:jminac1811@gmail.com)  
**Office:** Middlesex College, room 131 (I also use the university campus as a large, outdoor office).  
**Office Telephone:** 519 661-2111, extension 86519.  
**Office Hours:** Will be discussed in class.  
**Class Times and Location:** To be decided in Department of Mathematics meeting, September 8, 2011, MC 107, 10:00 a.m.  
**Prerequisites:** Good knowledge of undergraduate algebra.  
**Evaluation:** Will be discussed in class.

**Text:** *An Algebraic Introduction to K-Theory*, by Bruce A. Magurn, Cambridge University Press, 2009. Other references to be discussed in class.



What has a Möbius strip to do with non-unique factorizations in rings of algebraic numbers? How many linearly independent tangent vector fields exist on the sphere  $S^n$ ? For a field  $F$ , what is the smallest number of squares such that their sum is  $-1$ ? What are the possible Galois groups over a given field? What are all of the possible division algebras over a given field? What is the connection between the distribution of primes and zeta functions?



D. Quillen



T. Y. Lam



A. Suslin

## Course Outline:

These are all natural, tantalizing questions discussed in cafes, on walks, at parties, and on soccer breaks. They are connected with ideas in K-theory.

Amazingly, some of these questions have been solved, and in some of the other questions, spectacular progress has been made. We are living in awesome mathematical times, and I would like to share them with you.

In this course only a basic, solid background in linear algebra is assumed, so that the members of this class will not fall from their chairs, surprised that vector spaces can be considered over all fields; not necessarily just real or complex numbers. Stress will be given to  $K_0$  and  $K_2$ , as well as to basic Milnor K-theory. Connections with Witt rings of quadratic forms, representation rings, Brauer groups, and cohomology and Galois groups, will be explored. The Bloch-Kato conjecture and its various applications will be discussed.



A. Merkurjev



M. Rost

$$\text{III}(t) = \bigoplus_{\mathfrak{q}} \frac{H_f^1(\mathbb{Q}, A_{\mathfrak{q}}(t))}{\pi_* H_f^1(\mathbb{Q}, M_{\mathfrak{q}}(t))}.$$

Another Bloch-Kato conjecture



V. Voevodsky

**Scholastic offences:** Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

[http://www.uwo.ca/univsec/handbook/appeals/scholastic\\_discipline\\_grad.pdf](http://www.uwo.ca/univsec/handbook/appeals/scholastic_discipline_grad.pdf)