



ALGANT Consortium

Université Bordeaux 1 – FR
Chennai Mathematical Institute – IN
Universiteit Leiden – NL
Università degli Studi di Milano - IT
Concordia University/CRM/ISM – CA
Università degli Studi di Padova – IT
Université Paris Sud 11 – FR
Stellenbosch University/AIMS – ZA



ALGANT Summer school

Elliptic curves

Institut de mathématiques de Bordeaux

July 15th to 18th, 2010

Overall presentation

For the first time this year, the ALGANT consortium, which has been created in 2004, organizes a Summer school. In the previous years, other joint activities were offered to the students enrolled in the course, but the need was felt to offer a complete course of lectures on a topic at the heart of the subject around which the consortium has been created: Algebra, Geometry and Number Theory.

The Summer school will take place in Bordeaux, after the Joint graduation ceremony, which will follow the thesis defences by the students completing their second year in the ALGANT master course.

The topic of elliptic curves chosen for the School is a classical one, but thanks to the expertise of the ALGANT staff, many different and novel aspects will be covered in the four days of classes.

Each of the four days will be organised as follows. In the morning, three one-hour lectures will be given and exercise sheets will be handed out. In the afternoon, students work on the exercises, either on their own or in small groups, under the supervision of the teachers. The students present solutions on the blackboard at the end of the day. Coffee breaks, lunches and dinners will be taken together.

Over 30 students are already enrolled for the School, and we encourage any interested students to attend it.

Scientific programme

The overall organisation has been explained above, here we indicate the titles of the morning lectures and the name of the lecturers.

The lectures will be given by:

- Fabrizio Andreatta (FA), Milano
- Massimo Bertolini (MB), Milano
- Peter Bruin (PB), Leiden
- Bas Edixhoven (BE), Leiden
- Hendrik W. Lenstra (HWL), Leiden
- Peter Stevenhagen (PSH), Leiden

The lectures are organised as follows (please go to the next page):

Thursday, July 15th

- Introduction to elliptic curves (PSH)
- Elliptic curve algorithms--1 (HWL)
- Elliptic curve algorithms--2 (HWL)

Friday, July 16th

- Elliptic curve algorithms--3 (PSH)
- Modular curves, their jacobians; modular parametrisation of elliptic curves over \mathbf{Q} - 1 (BE/PB)
- Modular curves, their jacobians; modular parametrisation of elliptic curves over \mathbf{Q} - 2 (BE/PB)

Saturday, July 17th

- Modular curves, their jacobians; modular parametrisation of elliptic curves over \mathbf{Q} - 3 (BE/PB)
- Modular forms of higher weight, Galois representations, modularity (BE/PB)
- Rational points and Selmer groups (MB)

Sunday, July 18th

- Rational points and L-series (MB)
- Local cohomology groups attached to elliptic curves (FA)
- Euler factors of L-series (FA)

For more information, see:

www.algant.eu