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## Topics in Number Theory

### Syllabus

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**Course description:** We shall cover most of the acclaimed and prize-winner book ‘A Course in Arithmetic’ by J.-P. Serre, thus providing algebraic and analytic methods of Number Theory to graduate students working in any area of Mathematics. By the end of the course, depending on students and on time, we may discuss results on integral quadratic forms (occurring, for instance, in differential topology and finite group theory), and on modular forms (which have wide and deep connections in Mathematics and Physics, e.g., with finite groups, Lie algebras, and string theory via moonshine).

**Course prerequisites:** Formally, only basic undergraduate mathematics. Nevertheless, a quick review of Algebra, Topology, and Complex Analysis will occur before Serre’s Ch. I, II, and VI.

**Instructor:** Prof. Dr. Theo A. D. Zapata (zapata.unb @ gmail.com).

**Course Platform:** Microsoft Teams. The team *Topics in Number Theory (Zapata) 2021/1* was created as a proper channel for the course’s development (classroom meetings, announcements, homework, exchanging ideas, etc.).

**Classroom Meetings:** Via the Course Platform on Tuesdays and Thursdays, and on occasional Fridays, 16:00-17:50 (BRT). Teaching will be remote and synchronous; in particular, it will be presential.

**Office Hours:** Via the Course Platform on Fridays 15:30-16:00 (BRT).

**Dates:** Period of classes: 20/Jul – 5/Nov. No classes: 7/Sep, 12/Oct, and 2/Nov.

**Text:** J.-P. Serre’s *Cours d’arithmétique* (Presses Univ. France, 1970) was translated into Chinese, English, Japanese, and Russian. It is easy to find a physical or virtual version of it; anyone will do.

**Languages:** Students may use any romance language for communication in class and for formal assignments, but the current scientific lingua franca (English) is encouraged.

**Homework:** There will be regular homework: solving problems and working the reading material. The findings of these activities will be presented in classroom.

**Exams:** There will be no written exam.

**Grading:** The components of the course are weighted as follows:

<i>Final grade</i>	Problem sets	Reading material
<i>100%</i>	60%	40%

According to the UnB General Regulation, the student who attends less than 75% of the respective curricular activities gets the failure grade SR. The student who gets a final average greater than or equal to 5 and does not obtain SR will be approved.

Due to COVID-19, for the purpose of attendance and workload, students who are not present in a class may have their attendance registered in the activities of that class by writing a solution to an exercise to be requested to the instructor.

**Remarks:**

- 1) The information in classroom or contained in the course’s material is confidential or privileged, and its confidentiality is protected by law. The student enrolled in the course is a person authorized to use such material for study purposes, and is prohibited to record, publish or disseminate any part of the content, without the author’s express and written authorization.
- 2) The present document does not substitute the published version in the Course Platform.