Reading Seminar 1 : Pure mathematics

Learning Goals: The purpose of this reading seminar is to let the students interested in pure mathematics learn some important and well established mathematical theories in an active way. The students will be required to learn and expose publicly (via a weekly seminar organised in the rooms of the Institut de Math ematiques de Toulouse) different topics determined at the beginning of the year in collaboration with the organiser of the seminar.

Summary of the content: The contents of the seminars of the students vary on a yearly basis are proposed by the organiser of the seminar and selected and distributed at the beginning of the semester. The plan for the 2017-2018 edition is to acquire a good knowledge of the so-called Chern-Weyl theory. We will first study the basic definitions of differential manifold and of vector bundles as well as the basic operations on these objects. Then after studying the notion of connection on a vector bundle and recalling some basic facts in algebraic topology, we will define principal bundles and connections on them with the final goal of studying the relations between the curvature of these connections and the topological properties of the bundle.

PREREQUISITES Basic knowledge of real smooth functions of many variables and of smooth manifold. Basic topology (covering, fundamental group). The notion of Lie group.

REFERENCES L. Nicolaescu, Lectures on the geometry of manifolds.