Evolutionary game theory (EGT) is a growing research field that has been blending different sciences through the development of a common mathematical formalism. Biology, sociology, economics have proved to be a fruitful field to applied the concepts associated to game theory. EGT together with the help of non-linear dynamics has given place to a plethora of new results and helped to deepen the comprehension of several emerging phenomena. In this course we will introduce the key concepts of game theory and the fundamental elements of non-linear dynamics to learn how to apply them in the analysis of several situations linked to social dynamics, economics and evolution.