Abdelkader Dehici, University of Guelma.
Title: Measure of noncompactness and some new results in Fredholm Theory
Abstract: The work presented here has as a central subject the study of certain class of operators allowing to derive the interesting results intervening in the Fredholm theory, which represents one of the tools for the resolution of the equations of the type $u - Tu = f$ (Fredholm alternative). Our analysis is based on the remarkable properties satisfied by the concept of measure of non-compactness of bounded operators. These properties will bring us sufficient conditions for which $Q(T) \in \Phi(X)$ with index 0 for a certain class of complex polynomials Q. The objective is to establish a rather general functional framework which enable us to unify many well known results in this direction. Indeed, we show that if $A \in \mathcal{L}(X)$ and $P,\ Q$ are two complex polynomials satisfying $Q(0), P(1) \neq 0$ with Q divide $P - P(1)$, and if $\delta((P(tA))) < |P(1)|, \forall t \in]0, 1]$, then $Q(A) \in \Phi(X)$ with index 0, this represents a quasi-macroscopic study of certain contributions. Moreover, an extension of a part of the analysis carried out by several authors was established. It is a question of giving a new characterization of Weyl essential spectrum of closed densely defined operators in Banach spaces.