Let $R$ be a commutative noetherian ring. A finitely generated $R$–module $C$ is called semidualizing if the natural homothety map $\chi^R_C : R \to \text{Hom}_R(C,C)$ is an isomorphism and $\text{Ext}^>_{R^0}(C,C) = 0$. For example every finite projective $R$–module of rank 1 is semidualizing. A semidualizing $R$–module $C$ gives rise to two full subcategories of the category of $R$–modules, namely the Auslander class $\mathcal{A}_C(R)$ and the Bass class $\mathcal{B}_C(R)$ defined by Avramov and Foxby. An element $x$ of $R$ is called an exact zero–divisor on an $R$–module $M$ if $xM \neq M$, $xM \neq 0$ and there is $y \in R$ such that the sequence of multiplication maps $M \xrightarrow{x} M \xrightarrow{y} M \xrightarrow{x} M$ is exact.

In this talk, we are going to investigate the effect of an exact zero–divisor on a semidualizing module $C$ and the classes $\mathcal{A}_C(R)$ and $\mathcal{B}_C(R)$.

We also discuss about the class of $C$–projective modules, $\mathcal{P}_C(R)$, modulo exact zero divisors. We show that if $x$ is an exact zero–divisor on both $R$ and $C$, then $x$ is an exact zero–divisor on an $R$–module $M$ whenever $\mathcal{P}_C - \text{pd}(M) < \infty$, which implies that $\mathcal{P}_{C/xC} - \text{pd}(M/xM) \leq \mathcal{P}_C - \text{pd}(M)$. This is a joint work with Mohammad T. Dibaei.