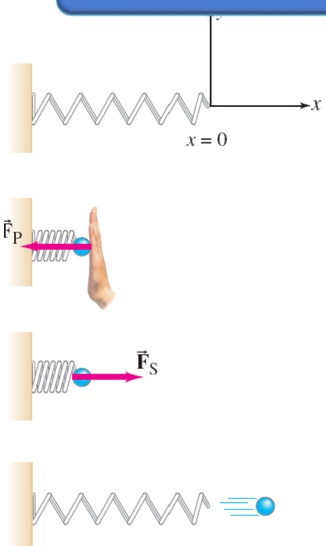
8.2 Analysis Model: Isolated System (Energy)

conservative force e.g : $F_g = mg$	e.g : $f_s = \mu_s\, n$
acts on an isolated system	acts on a non-isolated system
Caused no change of a mechanical energy $\Delta E_{mech} = 0$ $E_{f,mech} = E_{i,mech}$	Caused a change in a mechanical energy $\Delta E_{mech} = E_{int}$ $\Delta E_{mech} = - f_s . d$ $E_{f,mech} \neq E_{i,mech}$
$E_{mech} = K + U$ $\Delta E_{mech} = \Delta K + \Delta U = 0$	$E_{f,mech} = E_{i,mech} + E_{int}$ $\Delta E_{mech} = \Delta K + \Delta U = - f_s . d$
$\Delta K = - \Delta U$ $W_{net} = \Delta K$ $W_{net} = - \Delta U$	$W_{net} = \Delta E_{mech} = \Delta K + \Delta U = - f_s . d$

Elastic Potential Energy



A spring has potential energy, called elastic potential energy, when it is compressed. The force required to compress or stretch a spring is:

$$F_S = -kx,$$

where k is called the spring constant.

The potential energy is:

$$U_{el}(x) = \tfrac{1}{2}kx^2.$$