WEEK 1 : CONDUCTIVE HEAT TRANSFER

Conductive heat transfer goes through solids because of temperature differences

Steady state heat conduction in a plane wall :

- $\dot{Q}_{in} - \dot{Q}_{out} = dE_{wall} / dt$
- Fourrier's law of heat conduction : $\dot{Q}_{cond,wall} = -kA \cdot DT/dx$
- $\dot{Q}_{cond,wall} = kA \cdot (T_1-T_2)/L$

Heat conduction through walls :

- $\dot{Q}_{cond,wall} = kA \cdot \Delta T/L$
- $\dot{Q}_{cond,wall} = \Delta T/Rwall$ ($Rwall = L/kA$)

- Heat transfer through a wall is propotional to it's area
- It's propotional to the difference of temperature and the conductivity (willingness of a material to transfer heat)
- It's inversely propotional to the thicknes => the thicker the wall, the less heat goes through it
- The unit of conductivity is w/mK

EXERCICE :

- $\dot{Q} = kA \cdot \Delta T/L$
  $= 0,78*20*(25/0,4)$
  $= 975$ w

- $\dot{Q} = \Delta T/Rwall$ ($Rwall = L/kA$)
  $Rwall = 0,4/(0,78*20) = 0,02564103$

  $\dot{Q} = 25/0,02564103$
  $= 974,9$ w