Week 4

Task 1: you should complete the modified example of simplified wall calculations that you went through in the assignment of week 3 and find the total heat transfer through wall

	Wood	Insulation
Outside Air	0.03	0.03
Wood bevel l.	0.14	0.14
Playwood	0.11	0.11
Urethane rigid foam	No	0.98*90/25
Wood studs	0.63	No
Gypsum board	0.079	0.079
Inside surface	0.12	0.12

$A_{wall} = 50 * 0.8 = 100m^2$

$R_{wood=}\, 0.3 + 0.14 + 0.11 + 0.79 + 0.12 + 0.63 = 1.1 \frac{m^2 C^0}{\dot{W}}$

$R_{insulation} = 0.3 + 0.14 + 0.11 + (0.98*90/25\ ) + O.O79 = 1.109\ \frac{m^2 C^0}{\dot{W}}$

Overall heat transfer coefficient

$$U_{tot} = U_{wood} \times \frac{A_{wood}}{A_{tot}} + U_{ins} \times \frac{A_{ins}}{A_{tot}} = U_{wood} \times 0.25 + U_{ins} \times 0.75$$

$$U_{wood} = \frac{1}{R'_{wood}} = \frac{1}{1.109} = 0.8137$$

$$U_{ins} = \frac{1}{R'_{ins}} = \frac{1}{4{,}007} = 0.42 = 0.2496\ \frac{m^2 C^0}{\dot{W}}$$

$$U_{tot} = 0.9017 * 25 + 0.2496 \times 0.2496 = 0.4126 \frac{W}{m^{2\circ} C}$$

From the definition of U

$$Q_{tot} = U_{tot} \times A_{tot} \times \Delta T = 0.4126 * 100 * 24 = 990.24$$

Task 2 In 2 pages you should write a summary (in your own word!, in your own words !!) of what you have learnt in this session about radiation and radiative heat transfer

Radiation is a heat transfer through electromagnetic waves. For radiation to happen it is not necessary that the source of the heat is in contact with the object to which energy is being transfer. This is opposite in conduction and convection. Radiation can be in gas, liquid and solid. The visible radiation is called light. . For example Sun is one of that kind of radiation, but the energy that is produced by the Sun is also known as solar radiation. Ultraviolet and infrared light are part of radiation that is produced by the sun but it is not visible.
Bodies can emit different amount of the energy. The body that absorbs energy will also emit it. Every body can emit and absorb the energy, and the emotion depends on a temperature of the surface that is source of the energy.
The one that absorbs all the energy and emits all et the given temperature is called black body. Radiation heat transfer rate, q [W/m2], from a body (e.g. a black body) to its surroundings is proportional to the fourth power of the absolute temperature and can be expressed by the following equation's = $\varepsilon\sigma T4$ - this is Stefan–Boltzmann Law. σ is a fundamental physical constant called the Stefan–Boltzmann constant, which is equal to 5.6697×10-8 W/m2K4.
Radiation can be natural or artificial. The natural one that we are exposed to it every day is the one from the Sun and soil. The artificial one, or the one that is made by a human, can be the one emitted by television, microwave, medical procedures. Radiation can also be dangerous sometimes, but that depends on the strength and the distance (length)