

ASSIGMENT 7 (WEEK 7)

Task 1: Provide a summary of the main concepts that went through about solar radiation (formulas are not needed)

The availability of solar energy in any location in the world can be studied by two methods. The first involves measurements from a radiation monitoring network and the second is based on the use of physical formulae and constants. Solar constant is a term used to define the rate at which solar radiation is received outside the earth's atmosphere, at the earth's mean distance from the sun, by a unit surface perpendicular to the solar beam.

Solar Radiation is energy that is coming from the sun, mostly in the form of electromagnetic waves, including visible and ultraviolet light and infrared radiation. Energy that the sun is radiating can be transmitted, absorbed or scattered.

The spectral distribution of direct solar radiation is altered as it passes through the atmosphere by *absorption* and *scattering*. The amount of energy absorbed depends on the length of path in which the solar beam traverses.

The energy that drives the climate system comes from the Sun. When the Sun's energy reaches the Earth it is partially absorbed in different parts of the climate system. The absorbed energy is converted back to heat, which causes the Earth to warm up and makes it habitable.

In the scattering of radiant energy in the atmosphere, the shortwave radiation reaching the earth's surface is not only direct solar but also scattered (diffuse) radiation. The two energy distribution in the spectrum of diffuse radiation is: general characteristic and observational results. In general characteristics, the intensity of scattered light significantly depends on the scattered light wavelength—increasing with the decrease of wavelength in the majority of cases.

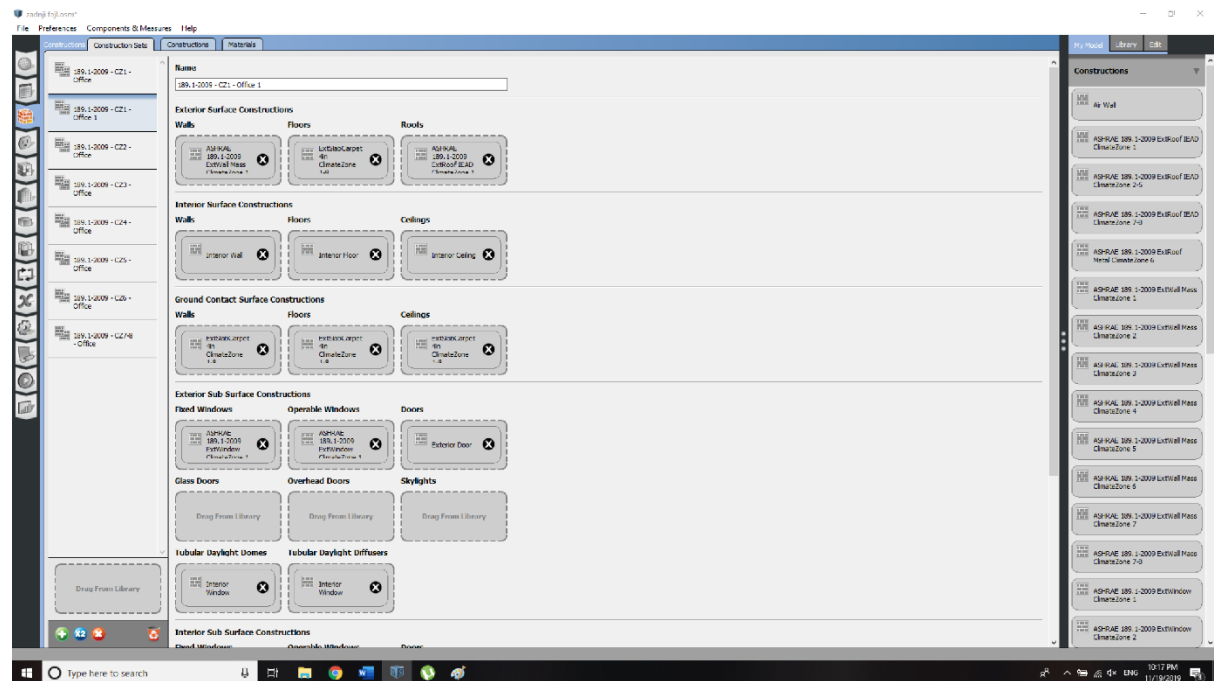
A common method of describing relative energy levels is the air mass, which is the ratio of the actual length the solar beam traverses relative to the depth of the atmosphere with the sun in its zenith position.

It is difficult to obtain reliable solar radiation data. The most reliable data is associated with the main meteorological stations, but these are often widely dispersed and a considerable distance from the location of any potential application. If we want to measure direct and diffused total solar energy we can use pyranometer.

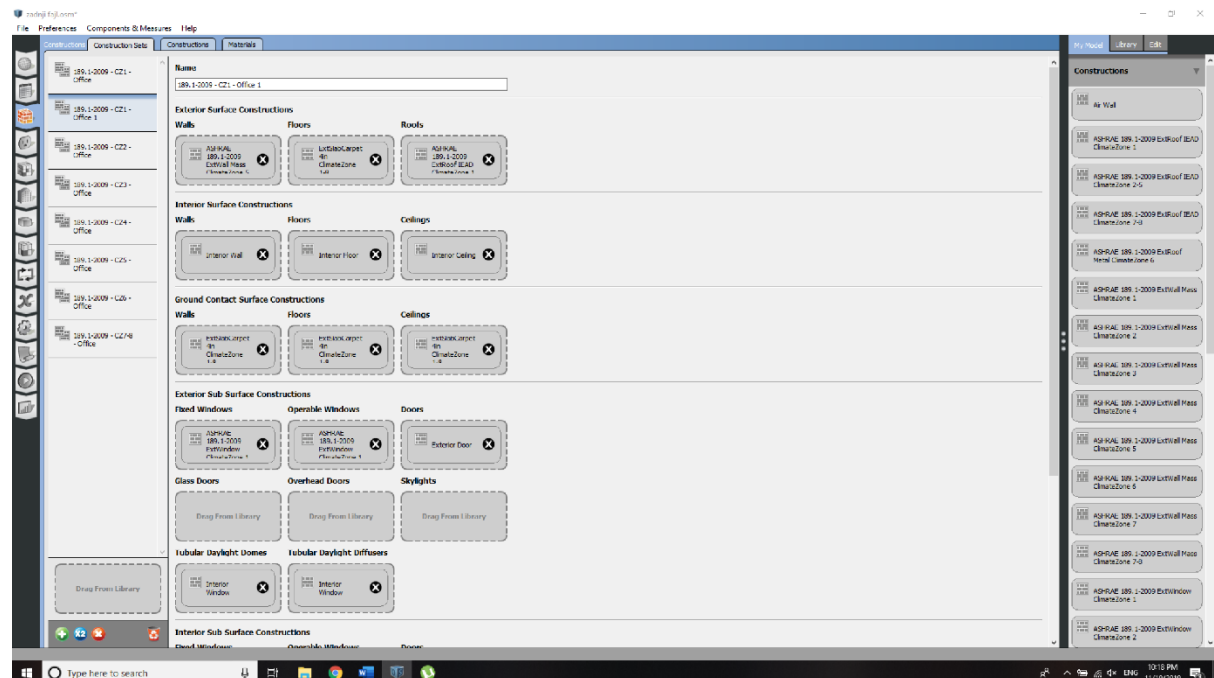
Solar radiation depends on:

1. Position of the sun;
2. The weather's conditions;
3. The site altitude and the sea level;
4. Length of the day;

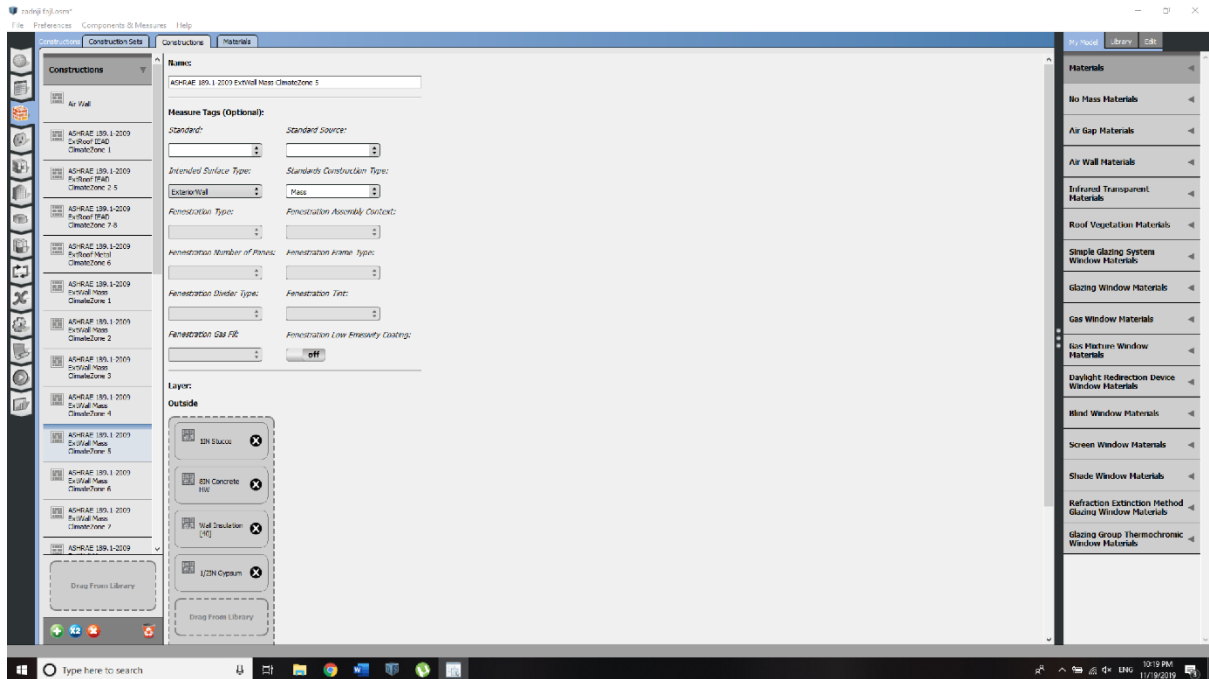
Task 2: You create a pdf file with screenshots of all of the steps we went through in the second lesson on openStudio and explain briefly the reason behind the use of each step.



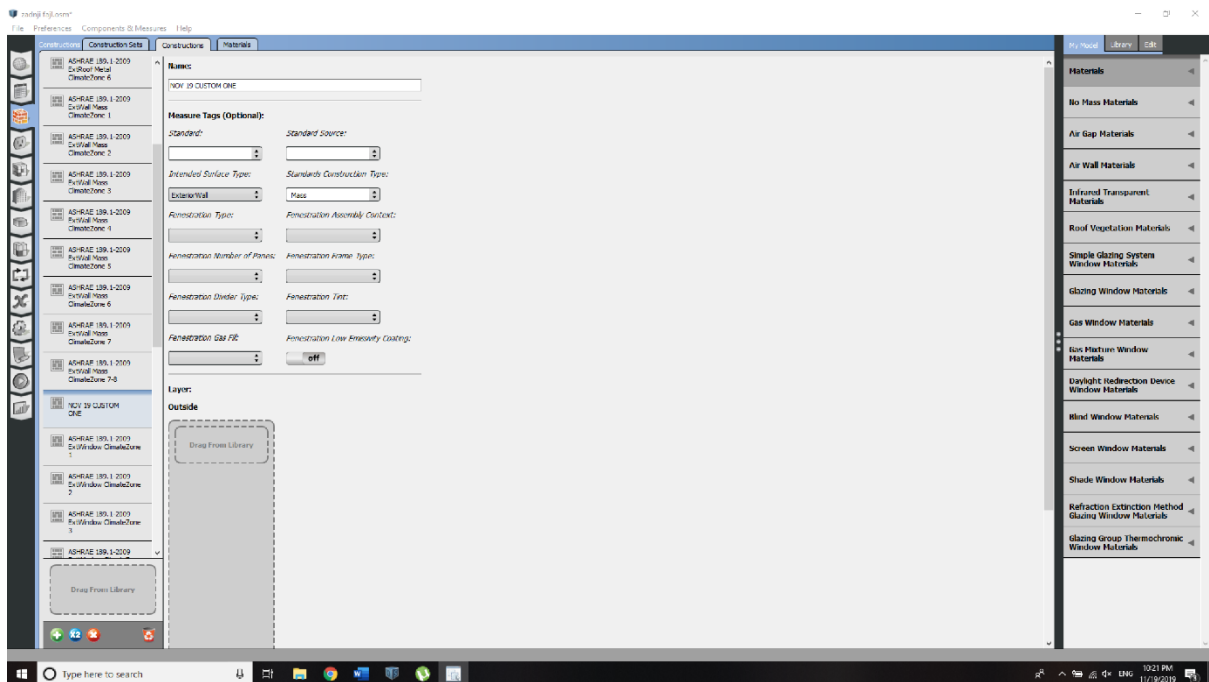
First we copy the wall with X2 tool



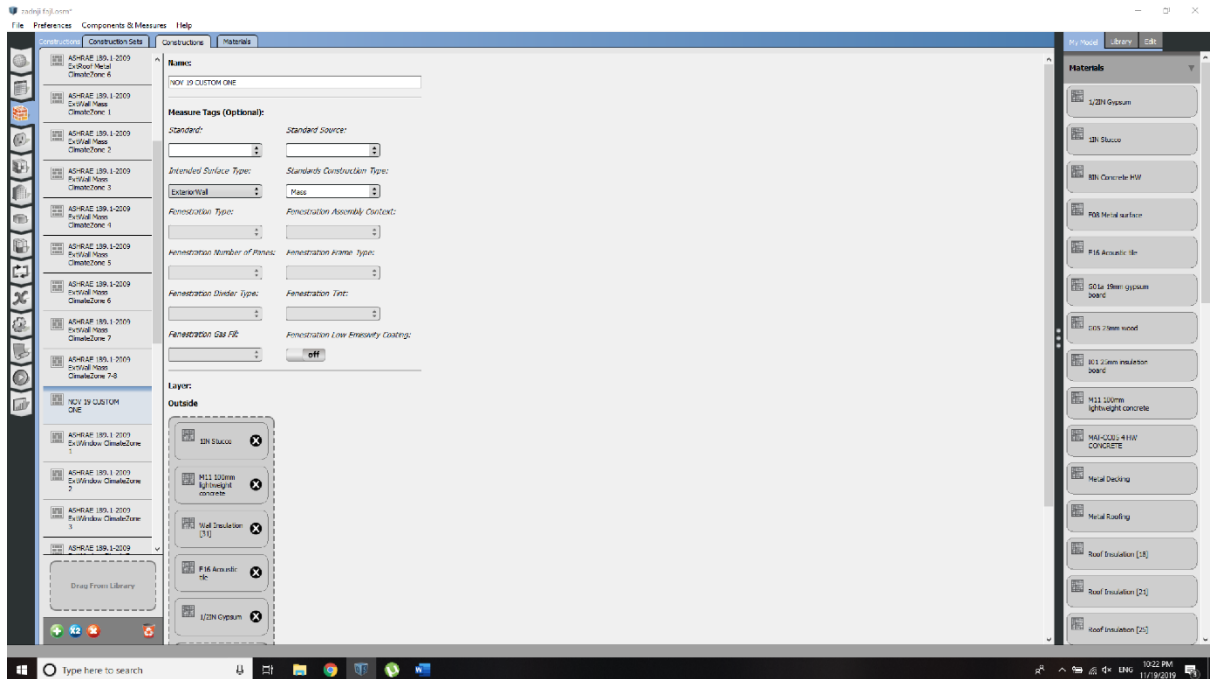
Next we change the wall construction



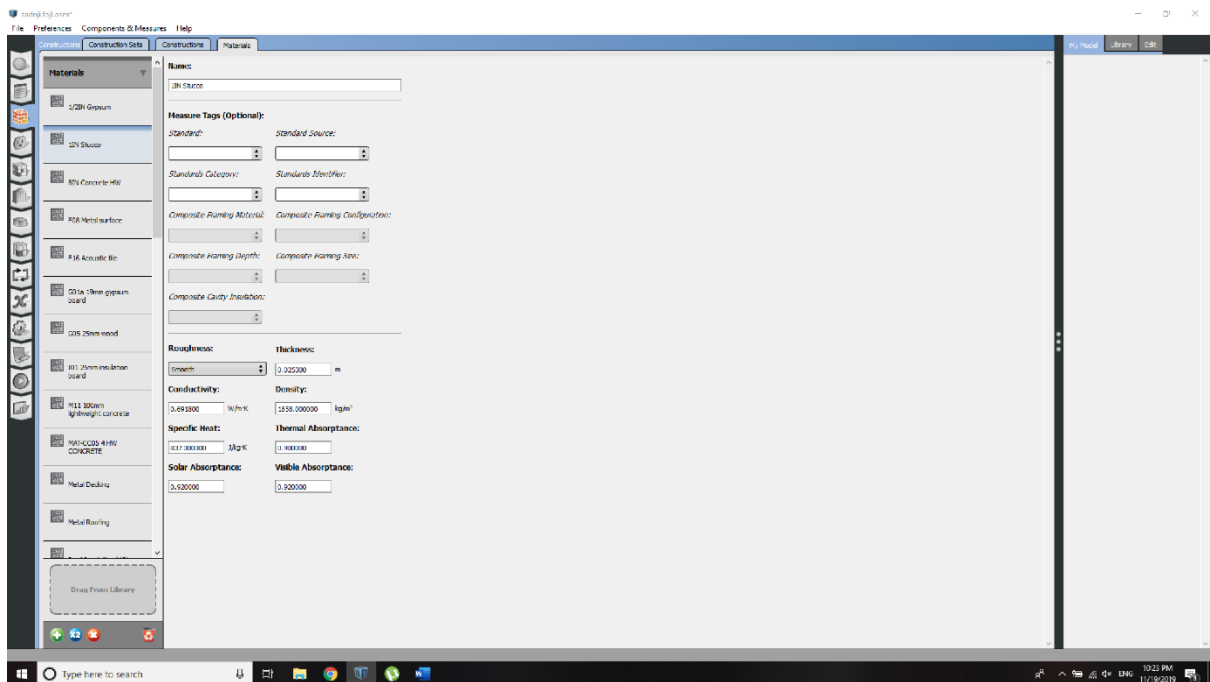
Open the constructions tab



Change the name



Remove layers and put new ones in



Open materials tab

