Use a weather forecast website, and utilize the psychometric chart and the formula we went through in the class to determine the absolute humidity, the wet-bulb temperature and the mass of water vapor in the air in Classroom A of Piacenza campus in the moment that you are solving this exercise Humidity: Relative humidity, Press one atmospheric: Air total pressure (1 hPa: 0.1 kPa), Temperature effective: temperature to be utilized. 16 December.

Relative humidity: 95 % Total air pressure: 102.1 kpa Effective Temperature: 6 C Absolute humidity:0.005 Kg vapor / Kg dry air Wet bulb temperature: 5

Mv =PV V/ RV T P Total = Pa + Pv ▯ = 0.622 Pv / P- Pv 0.005= 0.622 Pv / 102.1- Pv Pv=0.814 Kpa Classroom A= 6*10*6= 360 m2 Rv= 0.4615 T=279 k Mv = (0.814*360)/ (0.4615*279)

Utilize the same methodology we went through in the class and determine the sensible and latent load corresponding to internal gains, the ventilation, and the infiltration in a house with a good construction quality and with the same geometry as that of the example which is located in Brandis, Italy

BRINDISI, Italy

WMO#: **163200**

Lat: **40.65N** Long: **17.95E** Elev: **10** StdP: **101.2** Time Zone: **1.00 (EUW)** Period: **86-10** WBAN: **99999**

Annual Heating and Humidification Design Conditions

	Coldest Month	Heating DB		Humidification DP/MCDB and HR						Coldest month WS/MCDB				MCWS/PCWD to 99.6% DB		
				99.6%			99%			0.4%		1%				
		99.6%	99%	DP	HR	MCDB	DP	HR	MCDB	WS	MCDB	WS	MCDB	MCWS	PCWD	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	
(1)	2	2.9	4.1	-5.1	2.5	7.2	-3.0	3.0	7.4	13.4	10.2	12.4	10.6	3.4	250	(1)

Annual Cooling, Dehumidification, and Enthalpy Design Conditions

	Hottest Month	Hottest Month DB Range	Cooling DB/MCWB						Evaporation WB/MCDB						MCWS/PCWD to 0.4% DB		
			0.4%		1%		2%		0.4%		1%		2%				
			DB	MCWB	DB	MCWB	DB	MCWB	WB	MCDB	WB	MCDB	WB	MCDB	MCWS	PCWD	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	
(2)	8	7.1	32.8	23.6	31.1	24.3	29.9	24.3	27.2	29.7	26.3	29.0	25.6	28.3	4.2	180	(2)

	Dehumidification DP/MCDB and HR									Enthalpy/MCDB						Hours 8 to 4 & 12.8/20.6	
	0.4%			1%			2%			0.4%		1%		2%			
	DP	HR	MCDB	DP	HR	MCDB	DP	HR	MCDB	Enth	MCDB	Enth	MCDB	Enth	MCDB		
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	
(3)	26.3	21.8	29.2	25.4	20.7	28.5	24.7	19.7	27.9	86.0	30.1	82.2	29.1	78.5	28.3	1236	(3)

Extreme Annual Design Conditions

	Extreme Annual WS			Extreme Max WB	Extreme Annual DB				n-Year Return Period Values of Extreme DB								
					Mean		Standard deviation		n=5 years		n=10 years		n=20 years		n=50 years		
	1%	2.5%	5%		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	
(4)	11.3	9.9	8.7	31.4	0.4	37.3	1.4	3.0	-0.6	39.4	-1.4	41.1	-2.2	42.8	-3.2	44.9	(4)

Qig, s=136+2.2Acf+22Noc=136+2.2∗200+22∗2=620 W Qig, l=20+0.22Acf +12Noc=20+0.22∗200+12∗2=88 W

AL=Aes∗Aul=344∗1.4=481.6 cm2

Tcooling =24 °C, and heating temperature Threating =20 °C

Δ Tcooling=31.1 °C −24 °C=7.1 °C=7.1 K

Δ Theating=20 °C −(−4. 1 °C)=24.1 °C=24.1 K

DR = 7.1 °C=7.1 K

IDFheating=0.073L/s∗cm2,

IDFcooling=0.033L/s∗cm2,

Qi, heating=AL∗IDFheating=481.6∗0.073≈35.157L/s

Qi, cooling=AL∗IDFcooling=481.6∗0.033≈15.893L/s

Qv=0.05Acf+3.5(Nbr+1)=0.05∗200+3.5∗(1+1)=17L/s

Qi−v,heating =Qi, heating+Qv≈35.157+17=52.157L/s

Qi−v, cooling=Qi, cooling+Qv≈15.893+17=32.893L/s

Csensible=1.23 , Clatent=3010, ΔωCooling=0.0039

$Q_{inf-ventilation\ cooling\ sensible} = C_{sensible} Q_{i-v,\ cooling}\ \Delta T_{Cooling} \approx 1.23 * 32.893 * 7.1 \approx 287.25$ W

$Q_{inf-ventilation\ cooling\ latent} = C_{latent} Q_{i-v,\ cooling}\ \Delta \omega_{Cooling} \approx 3010 * 32.893 * 0.0039 \approx 386.13$ W

$Q_{inf-ventilation\ heating\ sensible} = C_{sensible} Q_{i-v,\ heating}\ \Delta T_{heating} \approx 1.23 * 52.157 * 24.1 \approx 1546.09$ W