Air-Conditioning & Refrigeration

BSc

Lecture 5 Update
Course weekly Outline &
Ch.1 (Introduction to Air conditioning & Refrigeration)
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3- An air conditioned space with inside design condition of DBT=25.5 °C, WBT=18 °C has a sensible heat gain of 17.5 kW and a latent heat gain of 2.0 kW. The space required an outside air of o.35 m³/s at DBT= 32.5 °C, RH= 50%.

Find:- a) the supply condition of the air if the relative humidity at the supply point is taken to be 90% and its mass flow rate, b) cooling coil load, c) plot the process on the psychrometric chart and calculate the BPF.

(Answers: Ts= 13.0 °C, Q_{coil}= 15.7 kJ/kg, m_s = 0.42 kg/s, BPF=0.20)
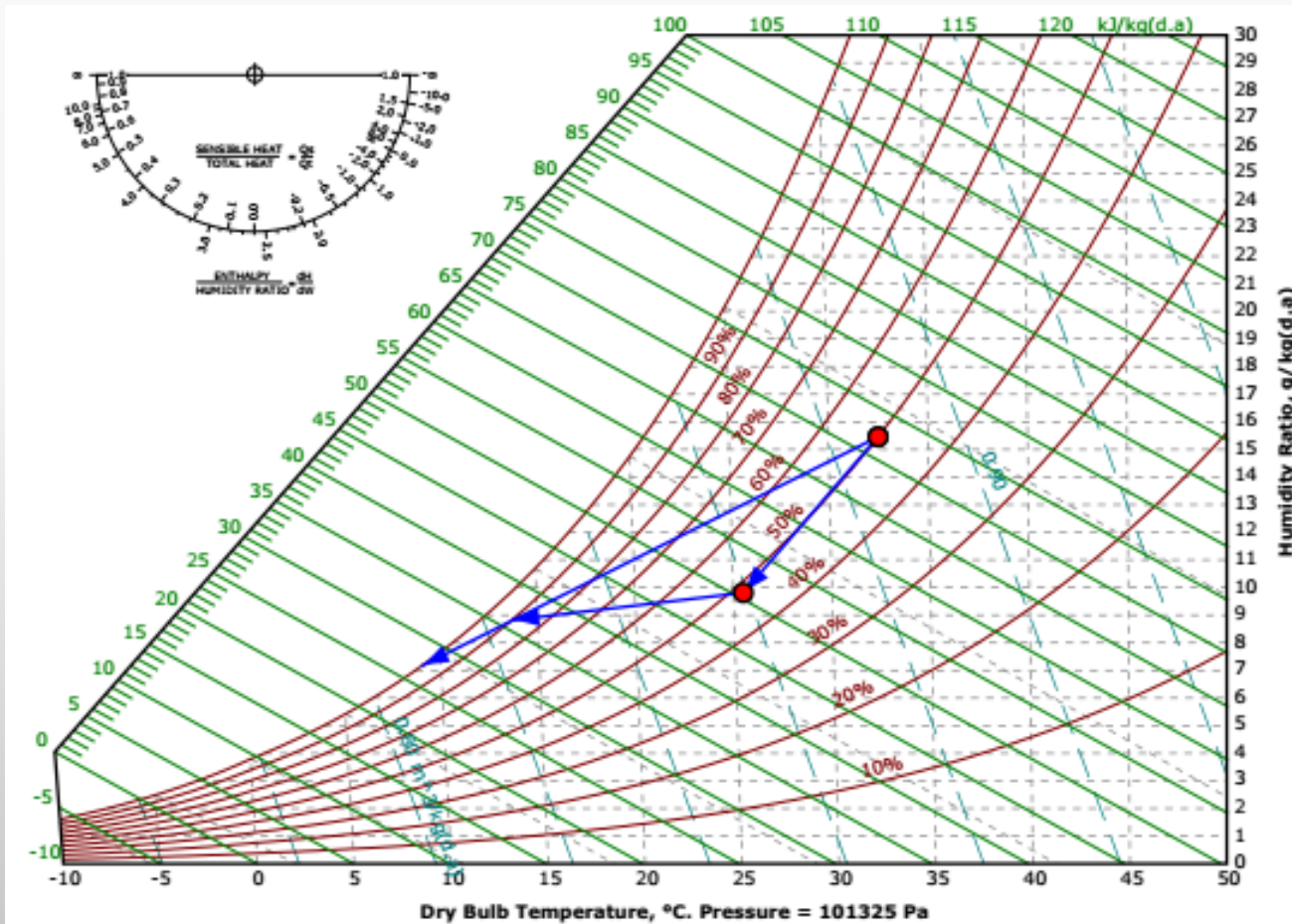
Example:

An air conditioned space is need to be maintained at DBT =24 °C, RH= 50%. The sensible heat loss of the space is 66 kW and its latent is 16.5 kW. The space required 28.3 m³/min fresh air. The outside design condition is DBT= 7 °C, RH= 80%.

Find:- a) Plot the air conditioning process on the chart. b) The mass flow rate of the supplied air given that Ts= 49 °C, c) The heating coil load d) The humidifier heating load, e) The amount of steam required by the humidifier.

(Answers m_s= 0.56 kg/s, Q_{coil}=28.0 kW, Q_{hum}= 6.7 kW, m_{vap}= 0.0028 kg/s)

Dry Bulb Temperature, °C. Pressure = 101325 Pa