



UEE (AR422)
**Facade design -
comfort, health
and energy**

Course overview

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Climate change is getting real

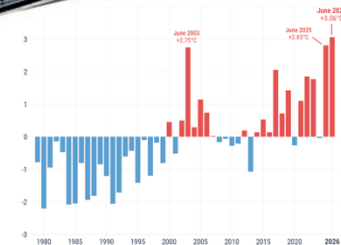
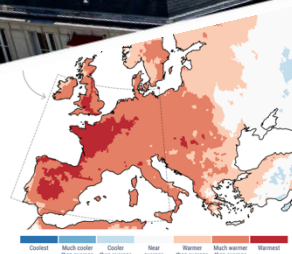
At least 35,000 excess deaths recorded in Europe's back-to-back heatwaves

True figure likely to be much higher as it only covers about half of continent and does not include August totals



Zinc-fried steak frites? Paris heatwave sends rooftop temperatures to 80°C

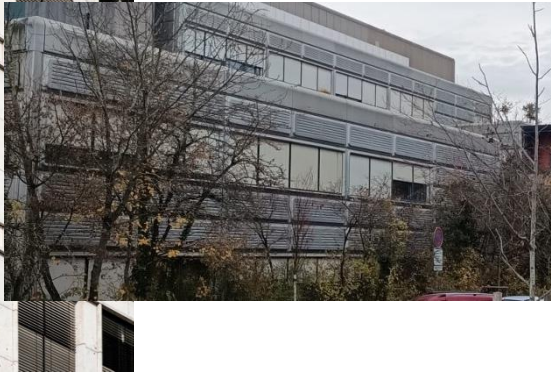
Temperatures are skyrocketing in the French capital, but authorities reject planning for AC units while attempts are made to mitigate heat with gardens



Colour categories refer to the percentiles of the temperature distributions for the 1979–2020 reference period. The “coolest” and “warmest” categories are based on June rankings for the period 1979–2020. The western European region outlined in the map and used for the time series covers all land area within 11°N–15°E, 37°–55°N.

How do buildings and occupants react?

Question : Is this the right way or shall we change the design of our buildings?



Impact on human physiology

High indoor temperatures

Heat exhaustion / stroke



Heart stress



Blood pressure



Sleep disruption



Lower productivity

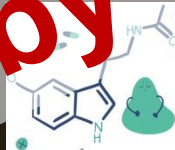


Dark Spaces

Heart rate



Melatonin secretion



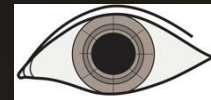
Sleep



Mood and Depression



Pupillary light reflex

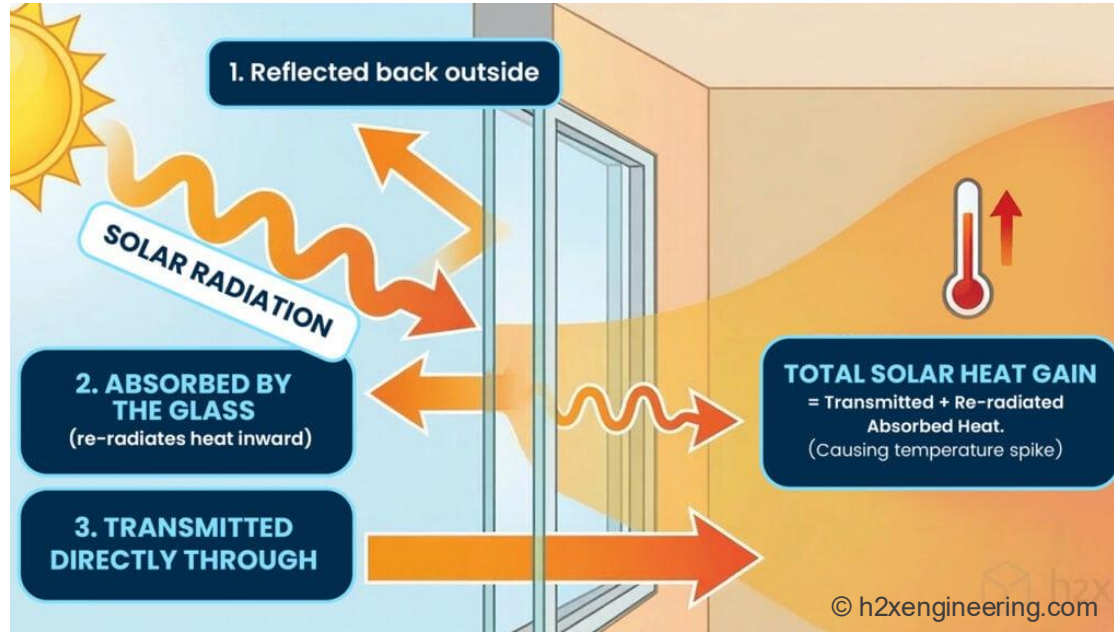


Body temperature



How can we avoid this by better design?

Facades: Dramatic impact on energy and daylight



This course should help to understand design decisions of facades on energy, comfort and health

Course Objectives/Content

- Overview about façade typologies
- Overview about materials for facades
- Impact of facades on energy:
Embedded and operational (heating, cooling, lighting)
- Impact of façades on thermal comfort
- Impact of facades on daylight provision and glare protection
- Impact of facades on health aspects (non-visual effects of light)

Learning goals

- Knowledge about the impact of the façade design and materials on energy, comfort and health
- To have an overview façade technologies
- To understand the methods for analyzing façades
- To perform a basic façade analysis

Recommendation

Taking the course

AR442 (Comfort and architecture: sustainable strategies)

is highly recommended as comfort metrics are introduced in depth.

1. Theory lectures with (a lot of) examples
2. Tool introduction session(s)
3. Project exercise
4. Excursion(s)

**More details will be
published in January
2027!!**

Questions ???

