

URBAN ENVIRONMENTAL PHYSICS

- The Building Environment. Basic energy and environmental characteristics. Evolution of the energy consumption.
- Characteristics of the urban environment. Urban climate and energy analysis. The heat island and canyon effect on the energy planning of the built environment.
- Thermal mitigation techniques of the urban environment. Sources and sinks. The contribution of materials. Energy balance of materials and systems. The life cycle of materials. Environmental effects.
- Indoor thermal balance. The heat island effect on buildings. Indoor Solar and Thermal radiation. Building envelope.
- Natural and mechanical ventilation of buildings. Air circulation in buildings. Pressure differences caused by wind and temperature differences. Calculation models of air flow under various boundary conditions.
- Indoor thermal comfort. The PMV model and dynamic models of thermal comfort.
- Indoor Visual comfort. Essential knowledge on natural lighting. Indoor Natural lighting calculation models.
- Indoor air quality. The “sick building” syndrome. The buildings air quality problem. The origins and primary characteristics of indoor air pollution.
- Production and transfer procedures of indoor pollutants. Main pollutants and their characteristics. International standards.
- Indoor methods and techniques for the reduction of pollutant concentration.
- Active solar systems. Energy balance of low and medium temperature solar systems. Passive solar systems. Passive cooling techniques. The use of renewable energy sources on the urban environment.