THERMAL ENERGY STORAGE

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Course Description:

Thermal Energy Storage is key in the development of renewable energy solutions. This is the most elegant and most effective way to make up for the mismatch between energy production and energy consumption. It has in addition the potential of solving the thermal management issues that come with data centers and increase over time. Thermal Energy Storage finds applications in space and water heating, cooling, and air-conditioning.
The proposed course will deliver fundamental knowledge of TES together with methodologies and models. It will complement the fundamental classes already taught in the graduate program such as advanced thermodynamics or advanced heat transfer.

Outcomes:

Following successful completing of the course, student will be able to:

- Analyze the different types of TES available solutions
- Understand the fundamental aspects of TES mechanisms
- Relate TES to environmental issues
- Relate TES to energy savings
- Design TES systems from a thermodynamics viewpoint
- Propose evolutions to the current TES systems.

Schedule:

Session (3h)	Topic
July 5, 2022 10h-13h	Class Introduction Objective, General aspects
	TES in history and society
	Energy Storage systems
July 7, 2022 10h-13h	Solar Energy and TES
	Sensible TES
	Latent TES
July 12, 2022 10h-13h	Thermochemical TES
	TES: choosing solutions
	Cold TES
July 14, 2022 10h-13h	TES and Environmental impact
	TES and Energy savings
	Case studies: Energy efficient building, Spain. Solar community, Canada.

References: Handbook of Energy Storage, M. Sterner and I. Stadler, Springer. Thermal Energy Storage, systems and applications, I. Dincer and M. Rosen, Wiley. Energy storage and civilization, a system approach, G. Palmer and J. Floyd, Springer.