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# Energy: Generation, Storage and Management

Ulysseus Blended Intensive Programme  
(BIP)



# General Course Information

## Course description

This course is aimed to everyone interested on learning about Energy, from generation to storage and management.



### CATEPS $\mu$ Grid Living-Lab

*Photovoltaic generation (4x15kWp)*



*Wind generation (5 kWp)*



*Batteries storage (80.64kWh with 60kWp)*



*Smart Building (Controllable loads)*



*Control Center*



**Main Objectives:**

- Optimal management DERs.
- Flexibility Market definition.
- Analytical AI tools and Digital Twin.
- Control interfaces and KPIs.
- Smart Building

Target group	Students Academic staff
Level (for students)	Bachelor (final year) Master PhD
Fields of study	Engineering; management and sustainability (related to energy)
Course dates	Virtual part from 13/05/2024 + Physical part from 20/ 05/ 24 to 24/ 05/24

## Course content

### Course Outline

The course will deal with energy, discussing different topics, from Energy generation, microgrids, storage, battery recycling, mobility and impact. There will be conferences as well as practical sessions. Participants will work in small groups.

### Course content

- Introduction to energy: from production to management
- Challenges facing Energy
- Batteries: design and fabrication
- Microgrid and Smart buildings
- Mobility
- Impact on sustainability










### Learning outcomes

- Electric mobility
- AI applied to smart energy systems
- Safety of rechargeable energy
- Microgrids
- Materials for batteries
- Energy and sustainability

Website: <https://institucional.us.es/energybip/>

## Course Practical Details

### Practical details

	Start date virtual part	13/05/2024
	Start date of the physical part	20/05/24
	Teaching language	English
	Location	Sevilla Edificio CATEPS, calle Euclides s/n, Isla de la Cartuja
	ECTS	3
	Workload	30
	Maximum number of participants	20
	Application details	Please contact your International Relations Office (IRO) of your home university. They will do their internal selection.
	Contact	mobilityulysseus@us.es

## Physical Mobility

Dates and location

See all detailed information in this link:

<https://drive.google.com/file/d/1cXOOSVi2d01P1xRHJtU-FGmhRAniIU5B/view>

## Virtual Component/Part

Practical Details Regarding the Virtual Component:

- **Virtual pre-phase:**
  - Presentation of participants
  - Introduction to the topic
- **Virtual post-phase:**
  - Summary/Feedback

## Requirements

Researchers, Master and PhD students; last course bachelor are also accepted.

## Person in charge

Prof. Dr. Ana María Beltrán Custodio [dirinternacionaleps@us.es](mailto:dirinternacionaleps@us.es)

## Accademic Team

Dr. Diego F. Larios

Dr. Enrique Personal

Dr. Manuel Félix



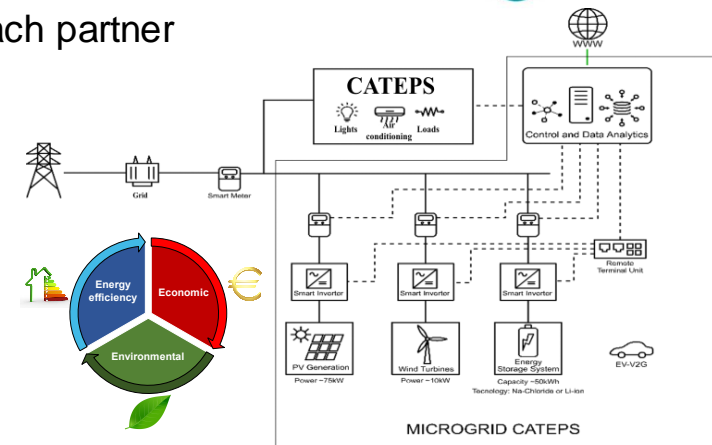
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## Structure:

- Virtual pre-phase: lecture regarding the topic.
- 5 days with blended learning elements (lectures, seminars and optional virtual lab courses).
- One general introduction followed by one hosted day by each partner institution.
- Timeslot: 2024/05/20 - 2024/05/24.
- Virtual post-phase: feedback, summary (5 units).
- Workload in total: 3 ECTS.



## CATEPS $\mu$ Grid Living-Lab

Photovoltaic generation (4x15kWp)



$\mu$ Wind generation (5kWp)



Batteries storage (80.64kWh)



Smart Building (Controllable loads)



Control Center





# BIP Energy: generation, storage and management

## Schedule



Online	Day 1 Introduction	Day 2 Battery	Day 3 Microgrids	Day 4 Mobility	Day 5 Impact	Online
<ul style="list-style-type: none"> <li>▪ Presentation of participants</li> <li>▪ Introduction to the topic</li> </ul>	<ul style="list-style-type: none"> <li>▪ Introduction within the topic</li> <li>▪ Academic and industrial perspective</li> </ul>	<ul style="list-style-type: none"> <li>▪ Design, Fabrication &amp; Management</li> </ul>	<ul style="list-style-type: none"> <li>• Microgrids and Smart Buildings in the context of Smart Cities</li> </ul>	<ul style="list-style-type: none"> <li>• Mobility challenging</li> </ul>	<ul style="list-style-type: none"> <li>• Impact on sustainability</li> </ul>	<ul style="list-style-type: none"> <li>• Summary</li> <li>• Feedback</li> </ul>
	Workshop 1	Workshop 2	Workshop 3	Workshop 4	Closing key notes	
	Team building	Visiting Seville	Cultural visit	Dinner		



More information:

[dirinternacionaleps@us.es](mailto:dirinternacionaleps@us.es)



# BIP Energy: generation, storage and management



## Program

		Monday 20th May	Tuesday 21th May	Wednesday 22th May	Thursday 23th May	Friday 24th May
Start	Online (Intro 1)	Day 1 (intro 2)	Day 2 (Microgrids)	Day 3 (Storage)	Day 4 (Mobility)	Day 5 (Impact)
8:30		Registration	Organizational Issues			
9:00		Welcome Dire				
9:30						
10:00	Presentation	CATEPS	<b>Conference 3</b> Safety of rechargeable energy Roberto Bubbico (La Sapienza)	<b>Conference 4</b> Supercapacitors-cells assembly Joao C. Mesquita (US)	<b>Conference 6</b> Optimization-based Energy Management Systems for smart grids. Michela Robba (Univ. Genova)	<b>Conference 7</b> The european electrical market. Rafael Sanchez (ENDESA)
10:30						
11:00		Coffee Break				
11:30						
12:00	<b>Conference 1.</b> Electric mobility in the context of smart networks and buildings. Stefano Bracco (Uni. Genova)	<b>Conference 2</b> Physics Informed and Trustworthy AI for Smart Energy Systems. Luca Oneto (Univ. Genova)	<b>Workshop 3</b> Visit Microgrid	My PhD/Master Thesis in 5 min	Working Team	Discussion of the results. Closing Remarks
12:30						
13:00		Lunch				
13:30						
14:00						
14:30						
15:00						
15:30		<b>Workshop 1</b> Machine Learning for Energy applications. Javier M. Mora (US)	<b>Workshop 2</b> Solar Oven (Un. Algarve)	Working Team	Presentations	
16:00						
16:30		Break				
17:00		Team Building	Working Team	Working Team (Optional)	Poster (Optional)	
17:30						
18:00						
18:30						
19:00		Visit Seville City Center	Social Event			
19:30						
20:00					Dinner	
20:30						
21:00						



More information: [dirinternacionaleps@us.es](mailto:dirinternacionaleps@us.es)