Name of the module (English): Sustainable Cities with Sustainable Buildings					
Module code (UP): M21 (provisional)		**Name of the module (Portuguese):** Cidades Sustentáveis com Edifícios Sustentáveis			
Module code (THM): IMTM (provisional)		**Name of the module (German):** Nachhaltige Städte mit nachhaltigen Gebäuden			
Module code (UC): M21 (provisional)		**Name of the module (Spanish):** Ciudades sostenibles con edificios sostenibles			
Credits: 6 ECTS	**Module status:** Obligatory	**Duration:** 1 semester	**Semester:** 2	**Year:** 1	**Frequency:** Every year
Type of tuition: Classroom-based		**Workload:** 180 h	**Attendance time:** 60 h	**Self-study time:** 120 h	
Usability: Master (Degree in Sustainable Design, Construction and Management of the Built Environment)			**Classification:** Engineering / Architecture	**Teaching language:** English	
Module responsibility: Maik Neumann (THM)		**Lecturers:** n/a			

Description / Observations:

Sustainability of the built environment comprising Cities and its buildings are driven by the local conditions. Thus the design process is based on a detailed climate analysis of the specific site, which is the starting point for energy effective city structures.

Within that City Framework specific building projects will be identified and worked out. All other module topics can be interlocked and combined with this module in order to reflect contemporary and future sustainability projects. This way an interdisciplinary and practical approach is enabled.

Recommended Requirements

Basic knowledge about sustainable concepts in design, construction and managements of buildings and infrastructures.

Basic competences:

- Possess and understand knowledge that provides a basis or opportunity to be original in the development and/or application of ideas, often in a research context.
- Students are able to apply their acquired knowledge and problem-solving skills in new or unfamiliar environments within broader (or multidisciplinary) contexts related to their area of study.
- Students are able to integrate knowledge and deal with the complexity of making judgments based on information that is incomplete or limited, including reflections on the social and ethical responsibilities associated with applying their knowledge and judgments.
- Students are able to communicate their findings and the ultimate knowledge and reasons behind them to specialist and non-specialist audiences in a clear and unambiguous manner.
- Students possess the learning skills to enable them to continue studying in a largely self-directed or autonomous manner.

Transverse competences:

Within the first part of the course the students learn to understand thermal and acoustic comfort as part of sustainability. To acquire the knowledge for this more theoretical part, different ways of learning and teaching are possible. The respective way depends on the field of knowledge. In the second part the focus is on the application of the acquired knowledge. To reach this goal it is necessary to work on case studies or real projects

Specific competences:

To know and be able to evaluate the best sustainable technical solutions related to the urban environment and be able to apply them at the level of a feasibility study.

Learning outcomes:

On successful completion of this module, the students will be able:

- To identify the relevant aspects of sustainable cities.
- To apply these principles and criteria in projects.

Content:

1. Local energy potential (sun, wind, geothermal energy)
2. Zero emission
3. Self-sufficient city quarters
4. Mobility
5. Sustainable infrastructure
6. Waste management systems,
7. Closed loop recycling.

Teaching methodology:

The purpose of the course is to cultivate and develop students' practical engineering skills, social awareness, team and project management skills.
The first part of the course will enable students to learn about the specifics of sustainable cities and buildings. Then they will have to demonstrate their understanding of the concepts with short presentations. Learners should then be able to use their prior knowledge to solve small problems, identify connections, and apply this to new situations.
The resulting solutions will have to be analyzed by other students. Based on this, students will construct a pattern of the various elements in a Project that will then be evaluated.

Training activities:

	Number of hours	% Attendance
Theory	30	100
Classroom practice	30	100
Tutorials	5	100
Evaluation	5	100
Group work	30	0
Self-directed work	50	0

Assessment method:

	Minimum weighting	Maximum weight
Continuous classroom evaluation	0%	25%
Final written work	50%	100%
Oral presentation	0%	50%

Grading system:

U.PORTO	20	19	18	17	16	15	14	13	12	11	10	9	...	0
Portugal	Very Good with distinction			Good with distinction		Good		Sufficient				Fail		
U.CANTABRIA	10.0	9.9	9.0	8.9	...		7.0	6.9	...		5.0	4.9	...	0.0
Spain	Sobresaliente			Notable				Aprobado				Suspenso		
THM	100	...	88	87	73	72	58	57	...		50	49	...	0
Germany	Excellent			Good with distinction		Satisfactory		Sufficient				Fail		

Bibliography:

The United Nations (2018): **The sustainable Development Goals.** New York: United Nations Publication
Pro21 GmbH (2013): Case Studies and Guidelines for Energy Efficient Communities: A Guidebook on Successful Urban Energy Planning. Stuttgart, Fraunhofer IRB Verlag

Current Status: 20200717