

Sustainable Science & Technology for Circular Economy

Master's Degree of the University of Padova, Italy

Foreseen starting date: 2021-2022 (October 2021)

Structure of the Master Degree (2 years, 120 ECTS)

Notes:

1 ECTS = 8 hours of classroom lessons

1 ECTS = 10 hours of computer-assisted exercises

1 ECTS = 12 hours of lab-work

First year (60 ECTS): common to two curricula

Course title	ECTS	Semester
Green Chemistry and innovative chemical process	9	1
Thermodynamics and catalysis for circular economy (C.I.)	12	1
Mod. A - Thermodynamics of processes and materials	6	
Mod. B - Catalysis for circular economy	6	
Operations & Supply Chain Management	6	1
Renewable energy technologies	6	1
EU Environmental and Energy Law	6	2
Water resources management in the circular economy	6	2
Economics for the Circular Economy	6	2
Circular and sustainable waste management	9	1

Second year 1° Curriculum “Resources and product design and recycling”

Course title	ECTS	Semester
Materials design & selection for circular economy	9	1
Sustainable materials and recycling for circular economy (C.I.)	18	1
Mod. A- Sustainable mineral (geo)-resources and critical raw materials (CRM)	6	
Mod. B- New plastics economy: polymers, biopolymers and their recycling	6	
Mod. C - Recycling and transformation of inorganic materials	6	
Circularity in biomass productions	6	2
Optional course 1: Advanced methods for sustainable processes and products	6	1
Optional course 2: Synthetic biotechnology	6	1
Optional course 3: Health and environment in circular economy	6	2
Optional course 4: Innovative hybrid energy and energy storage solutions for the sustainable development	6	2
Optional course 5: Life Cycle Assessment	6	1
Optional course 6: Psychology, policy making, and education to a circular economy	6	2
Optional course 7: Understanding statistics of circular economy	6	2
Optional course 8: Crystal chemistry of materials for the sustainable built environment	6	2
Internship within company or, alternatively, experimental thesis at a Department with a project in cooperation with a company	15	2

2° Curriculum “Energy conversion and storage”

Course title	ECTS	Semester
Biorefineries and sustainable energy production and storage for circular economy	15	1
Sustainability strategies and energy economics (C.I.)	12	1
Mod. A Sustainability strategies and Innovation management for Circular economy	6	
Mod. B Energy Economics	6	
Life Cycle Assessment	6	1
Optional course 1 Advanced methods for sustainable processes and products	6	1
Optional course 2 Synthetic biotechnology	6	1
Optional course 3 Health and environment in circular economy	6	2
Optional course 4 Innovative hybrid energy and energy storage solutions for the sustainable development	6	2
Optional course 5 Circularity in biomass productions	6	2
Optional course 6: Psychology, policy making, and education to a circular economy	6	2
Optional course 7: Understanding statistics of circular economy	6	2
Optional course 8: Crystal chemistry of materials for the sustainable built environment	6	2
Internship within company or, alternatively, experimental thesis at a Department with a project in cooperation with a company	15	2