General information	
Academic subject	Biomass and waste characterization
Degree course	INTERNATIONAL MASTER DEGREE COURSE IN INNOVATION DEVELOPMENT IN AGRIFOOD SYSTEMS (IDEAS)
ECTS credits	3 ECTS
Compulsory attendance	No
Teaching language	English

Subject teacher	Name Surname	Mail address
	Roberto Terzano	roberto.terzano@uniba.it

ECTS credits details		
	2 ECTS Lectures	1 ECTS Laboratory

Class schedule	
Period	Second semester
Course year	First year
Type of class	Lectures - Laboratory

Time management	
Hours	75
In-class study hours	30
Out-of-class study hours	45

Academic calendar	
Class begins	March 1st 2021
Class ends	June 11th 2021

Syllabus	
Prerequisites/requirements	Knowledge of basic mathematics, chemistry and physics
Expected learning outcomes	***Knowledge and understanding*** o Basic knowledge of the main analytical methods and procedures for the characterization of biomass and waste o Understanding the most relevant properties of biomass and waste that may influence their applications and transformations ***Applying knowledge and understanding*** o Capacity to valorize biomass and waste based on their physico-chemical properties o Understanding the main advantages and disadvantages of the analytical methods available for the characterization of biomass and waste ***Making informed judgements and choices*** o Ability to select the most appropriate analytical methodology to characterize the properties of biomass and waste relevant for their reutilization or transformation ***Communicating knowledge and understanding*** o Understanding the needs of the customer and proposing analytical solutions for the valorization of biomass and waste o Ability to interact with analytical laboratories to efficiently characterize biomass and waste for their

	reutilization or transformation ***Capacities to continue learning*** o Ability to deepen and update the knowledge about the most advanced and effective analytical methodologies for biomass and waste characterization
Contents	• Basic concepts of analytical chemistry • Proximate and ultimate analysis • Physico-chemical characterization methods • Structural and textural characterization methods • Particle size, surface area and pore size determination • Thermal analyses • Case studies and applications

Course program	
Reference books	• Lecture notes and teaching material made available during the course • Miguel Valcarcel Cases, Angela I. Lopez- Jimenez, Foundations of Analytical Chemistry, 2018, Springer • Ange Nzihou Ed., Handbook on Characterization of biomass, biowaste and related by-products, 2020, Springer • Silvio Vaz Jr. Ed., Analytical techniques and methods for biomass, 2016, Springer
Notes	
Teaching methods	Course contents will be presented through PowerPoint, blackboard, multimedia tools and laboratory practice.
Evaluation methods	The exam consists of an oral dissertation on a case study and on the topics developed during the theoretical lectures and practical laboratories. The expected learning outcomes, in terms of knowledge and skills, are listed in Annex A of the Master Degree Course Regulation (expressed through the European Descriptors of Degree qualification). Students attending the lectures may have a middle-term preliminary exam, consisting of a written test, relative to the first part of the program, which will concur to the final

	evaluation and will be considered valid for a year.
Evaluation criteria	***Knowledge and understanding*** o Knowledge of the basic of analytical chemistry for biomass and waste characterization o Understanding the main properties useful to characterize biomass and waste, and methods for their assessment ***Applied knowledge and understanding*** o Application of the acquired knowledge to solve case studies for specific biomass and waste materials ***Making informed judgements and choices*** o Capacity to select the most appropriate methodology for the assessment of specific properties of biomass or waste materials ***Communicating knowledge and understanding*** o Describing analytical methods and technologies to characterize biomass and waste ***Capacities to continue learning*** o Ability to understand and develop processes and technologies for biomass and waste valorization
Receiving times	Every day on appointment to be arranged in advance by e-mail.