Stampare su carta intestata del CdS

General information	
Academic subject	***Technology and energy policy***
Degree course	*Innovazione Governance e Sostenibilità*
Academic Year	*2022-23*
European Credit Transfer and Accumulation System (ECTS)	6 ECTS
Language	*English*
Academic calendar (starting and ending date)	
Attendance	*recommended*

Professor/ Lecturer	
Name and Surname	**Giovanni Lagioia,** **Vera Amicarelli;** **Teodoro Gallucci**
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Telephone	
Department and address	*Department of Economic Management and Business Law*
Virtual headquarters	*MS Teams: ma5sajy*
Tutoring (time and day)	Every Day online, Thursday (10-12) in presence

Syllabus	
Learning Objectives	*The course aims to provide adequate knowledge and understanding focusing on the main driver for setting the energy policy and on available technologies to produce and to transform energy. This basic awareness is necessary to better understand how to manage, to implement and to analyze national and international energy policies. It has also illustrated the environmental burdens of the different energy production chains, the consumption of the energy resources and the technological innovation for making energy generation more efficient. The underground aims are to highlight information necessary to define energy strategies at different levels: micro, meso and macro and to carry out the transition towards a more sustainable energy pattern.*
Course prerequisites	*none*
Contents	*Energy policy* *Energy Policy and energy transition - Energy crisis- Energy market trend and scenario – National Energy Balances* *Energy technology* *Photovoltaic system-Thermal solar- Hydrogen production and storage; ammonia production and possible uses as Hydrogen production and storage;* *Biomass (general overview) - Biogas Production - Biofuel (first, second and third generation);* *Energy Environmental issues* *Main environmental issues of energy generation-Carbon footprint (CF) definition-Carbon Footprint application and comparison between energy sector; Environmental impacts; rare earths minerals; CO_2 sequestration technology.*
Books and bibliography	*Lectures notes; scientific article. The supporting documents are available on MS Teams.* *Bibliografy* *Morena J. Acosta, Advances in Energy Research, vol. 11, 2012 ISBN 978-1-61942-825-6* *Grubb Michael, Who's afraid of atmospheric stabilisation ? Making the link between energy*

	resources and climate change, Energy Policy, 29 (2001), 837-845; *Giovanni Lagioia, Maria Pia Spinelli, Vera Amicarelli, Blue and green hydrogen energy to meet European decarbonisation objectives. An overview of perspectives and the current state of affairs, International journal of hydrogen energy, 48 (2023) 1304-1322;* *Rishabh Agarwal, Transition to a Hydrogen-Based Economy: Possibilities and Challenges, sustainability 2022, 14, 15975.* *Piyush Choudhary, Rakesh Kumar Srivastava, Sustainability perspectives- a review for solar photovoltaic trends and growth opportunities, Journal of Cleaner Production 227 (2019) 589e612,* *Marinella Favot∗, Antonio Massarutto, Rare-earth elements in the circular economy: The case of yttrium, Journal of Environmental Management 240 (2019) 504–510*
Additional materials	*The additional supporting materials are available on MS Teams.*

Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
Hours			
48	*40*	*8*	*102*
ECTS			
6	*(25h/CFU)*		
Teaching strategy	*Lectures and working groups activities. They could be also organized by e-learning platform. Seminars on specific topics will be arranged. Intermediate exams are scheduled for monitoring the achievement of main objects.*		
Expected learning outcomes			
Knowledge and understanding on:	*The students will be able to understand the European energy policy background, the energy conversion systems and the relative environmental impacts, the importance of rare earth minerals in the geopolitics policy to choose the most efficient technology for the energy production.*		
Applying knowledge and understanding on:	*The students will apply the knowledge both to analyse, interpret and explain phenomena and processes concerning the energy policy and the energetic environmental issues, to address and solve complex problems that arise in this context.*		
Soft skills	*Making informed judgments and choices* *- Making informed judgements and choices students will be capable of gathering and performing data necessary to organize independent assessments on issues concerning energetic issues.* *Communicating knowledge and understanding* *The knowledge concerning energy policy and production will prepare for professional skills capable of problem solving regarding:* *- challenges transition from no-renewable to renewable resources.* *- Environmental concerns about energy policy and energy production.* *Capacities to continue learning.* *The participation at lectures and practical workshops and home study will allow students to know and use independently.* *-energetic treatments methods and options.*		

	-environmental tools for making appropriate choices within energy policy.

Assessment and feedback	
Methods of assessment	*La prova di verifica è orale. Durante l'esame possono essere svolte applicazioni pratiche.*
Evaluation criteria	– *Knowledge and understanding* – To explain how the European energy sector works, what are the main policies to support a sustainable energy transition and the main tools for evaluating energy choices. – *Applying knowledge and understanding* – To apply the main energetic application to understand the best options on energy policy. – *Autonomy of judgment* – To evaluate, the dynamics that are affecting the energetic sector as a result of the energy transition, identifying the spillovers within production chains and suggesting possible. – *Communicating knowledge and understanding* – To discuss and argue, using technical language, the main issues related to energetic policies. – *Communication skills* – To describe the main effects of energy production on the environment with the capacity for critical analysis and problem-solving applied to different issues discussed. – *Capacities to continue learning.* – Sufficient exposure capabilities of their own ideas and acquired skill.
Criteria for assessment and attribution of the final mark	*Oral presentation with practical applications during the discussion.* *Ai fini dell'attribuzione del voto finale troveranno applicazione i seguenti criteri:* *-mancato superamento dell'esame: il candidato non raggiunge alcuno dei risultati di apprendimento attesi;* *- voto da 18 a 21: livello sufficiente (il candidato dimostra di aver acquisito i seguenti risultati di apprendimento: conoscenza e comprensione di almeno due dei criteri di base di definizione delle politiche energetiche e una conoscenza sufficiente di almeno una tecnologia energetica innovativa);* *- voto da 22 a 24: livello pienamente sufficiente (il candidato dimostra di aver acquisito i seguenti risultati di apprendimento: conoscenza e comprensione dei criteri di base di definizione delle politiche energetiche e; capacità di descrizione delle criticità del modello energetico corrente: risorse consumate tipologie e quantità e, infine, una conoscenza sufficiente di almeno due tecnologie energetiche innovative);* *- voto da 25/26: livello buono (il candidato dimostra di aver acquisito i seguenti risultati di apprendimento: conoscenza e comprensione piena dei criteri di base di definizione delle politiche energetiche; buona capacità di descrizione delle criticità del modello energetico corrente: risorse consumate tipologie e quantità e, infine, una conoscenza piena delle tecnologie energetiche innovative con particolare riferimento agli ostacoli che ne impediscono la piena implementazione e diffusione);* *- voto da 27 a 29: livello molto buono (il candidato dimostra di aver acquisito una buona padronanza di tutti i risultati di apprendimento attesi);* *- voto 30 e 30 e lode: livello eccellente (il candidato dimostra di aver acquisito pienamente tutti i risultati di apprendimento attesi)*
Additional information	///