General information	
Academic subject	***Economy of the agro-forestry-livestock systems*** *(module of I.C. "Agro-forestry-livestock systems")*
Degree course	Degree in Sustainable Agriculture Techniques (LP-02)
Academic Year	2021/2022
European Credit Transfer and Accumulation System (ECTS)	1
Language	Italian
Academic calendar (starting and ending date)	II semester (1st March 2022 – 17th June 2022
Attendance	Recommended

Professor/ Lecturer	
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Department and address	Ex Faculty of Agriculture, 4th building, 2nd floor, room 18 (entrance from via G. Amendola 165/A)
Virtual headquarters	Microsoft Teams Class (code: fmsmnmw)
Tutoring (time and day)	Tuesday and Wednesday, 3:00-5:00 PM; Thursday, 10:30-12:30 AM (previous appointment agreed by e-mail). Tutoring is also provided through Microsoft Teams.

Syllabus	
Learning Objectives	The course will provide an overall, basic knowledge on environmental economics and ecosystem services related to agro-forestry-livestock systems, on ecosystem services evaluation methods, and on ecosystem services regulation and compensation tools.
Course prerequisites	As it is a first year course, there are no specific prerequisites other than those for admission to the Degree course
Contents	• Introduction: principles of environmental economics; concepts of market failure, public goods and externalities; relationship between natural capital, socio-economic well-being, and sustainable development; environmental accounting • Framing ecosystem services: meaning; classification systems; cascade model; direct and indirect benefits; human pressures on natural capital; fluxes of ecosystem services related to agro-forestry-livestock systems • Approaches and methods of biophysical and economic evaluation of ecosystem services: mapping systems; estimation of the Total Economic Value; direct, indirect, and contingent valuation methods; examples • Ecosystem services provisioning regulation mechanisms: management and valorisation approaches (regulations; incentives and market mechanisms); ecosystem services compensation tools; PES and PSEA
Books and bibliography	Selected parts from: - G. Panella (2002), Economia e politiche dell'ambiente, Carocci - MEA [Millennium Ecosystem Assessment], 2005. Ecosystems and Human Well-being: Synthesis. Island Press, Washington, DC. - Comitato per il Capitale Naturale (2017). *Primo Rapporto sullo Stato del Capitale Naturale in Italia*. Roma - Comitato per il Capitale Naturale (2018). *Secondo Rapporto sullo Stato del Capitale Naturale in Italia*. Roma

	- Comitato per il Capitale Naturale (2019). *Terzo Rapporto sullo Stato del Capitale Naturale in Italia*. Roma Comitato per il Capitale Naturale (2021). *Quarto Rapporto sullo Stato del Capitale Naturale in Italia*. Roma
Additional materials	Supplementary material provided by teacher (lesson presentations and papers)

Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
Hours			
25	*8*		*17*
ECTS			
1	*1*		

Teaching strategy	
	The course will be held by way of frontal teaching lectures; attention will be paid to interaction and active participation of the students. Topics illustration will be supported by Power Point presentations, that will be fully made available to students, as study material.
Expected learning outcomes	
Knowledge and understanding on:	○ Understanding the relationships between human well-being and natural capital ○ Knowing the concepts of market failure, public goods, and externalities ○ Knowing the definitions and taxonomy of ecosystem services, the generated benefits, and the pressures undergone ○ Knowing the systems for mapping and economically valuating of ecosystem services ○ Knowing the economic tools for regulating the provisioning of ecosystem services and goods
Applying knowledge and understanding on:	○ Knowing how to recognize the ecosystem services' typologies and fluxes related to agro-forestry-livestock systems ○ Knowing how to map ecosystem services ○ Knowing how to quantify the economic value of ecosystem services
Soft skills	• *Making informed judgments and choices* ○ Being able to read the connections between ecosystem services, including trade-offs and synergies ○ Being able to interpret pros and cons of a given model of natural resources utilization • *Communicating knowledge and understanding* ○ Acquisition of the technical-scientific language specific of environmental economics and ecosystem services ○ Oral skills • *Capacities to continue learning* ○ Capacity of deepening and elaborating the topics covered in the course, also through supplementary readings suggested.

Assessment and feedback	
Methods of assessment	The profit exam consists in an oral test on the topics discussed in the course. A minimum of 3 questions will be asked to ascertain the students' preparation. The evaluation will be based on established criteria, as detailed in Annex A of the

	Teaching Regulations of the Degree Programme in Sustainable Agriculture Techniques (TAS). Foreign students may attend a written or oral exam in English.

Evaluation criteria	• *Knowledge and understanding*
	  ○ Knowledge of environmental economics principles, with special regard to public goods and externalities; of the relationship between the socio-economic well-being and stock/flows of natural capital; of the direct and indirect benefits deriving from ecosystem services; of the systems for classifying, mapping, and accounting for ecosystem services; of the tools for ecosystem services payment
	  ○ Understanding of the relationships between the agro-forestry-livestock systems and ecosystem services supply, and of the related opportunities, both from a perspective of sustainable management of natural resources (preservation and regeneration), and from an economic standpoint
	• *Applying knowledge and understanding*
	  ○ Capacity to set schemes for mapping and economically estimating ecosystem services, and to identify properly the information sources
	• *Autonomy of judgment*
	  ○ Capacity of assessing critically the potentials of agro-forestry-livestock systems to provide ecosystem services
	  ○ Capacity of interpreting the results of ecosystem services economic valuations
	  ○ Capacity of assessing the efficacy of political and market tools for regulating the use of natural resources and the provisioning of ecosystem services
	• *Communicating skills*
	  ○ Appropriate use of technical-scientific language of environmental economics
	  ○ Exposition clarity in discussing the topics covered within the course
	• *Capacities to continue learning*
	  ○ Ability to learn the theoretical and operative approaches for integrating ecosystem services into the agro-forestry-livestock economy

Criteria for assessment and attribution of the final mark	
Additional information	The examination provides an assessment of thirty. The exam is passed when a minimum score of 18/30 is achieved.