Environmental sustainability of ICT

Lecturer

Lecturer	Email	Office
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General information

Aim and scope

The course will introduce the interdependency and link issues among several disciplines - such as, for example, computer science, software engineering, environmental sciences, energy engineering, economics, telecommunications, artificial intelligence and machine learning, electronics, sociology - with a view of digital but ecological transition.

The overall goal is to provide an interdisciplinary research framework for research topics

Content

- ICT life cycle approach:

    environmental impact of ICT in use phase: Internet, Data Centers, user devices;

    environmental impact of ICT in the production phase;

    environmental impact of ICT in the disposal phase.

- Energy efficiency trends: technological improvements as counterbalance of growth in demand?

- Green and sustainable software engineering, algorithms and energy efficiency: sustainability by- design as software quality requirement;

- ICT services in the Public Cloud (Saas, PaaS, Iaas) with related GHG emissions; GHG protocol use in public cloud (vendor and customer sides), accountability and transparency related issues;

- Energy and carbon emissions: use of renewable energy sources and carbon intensity in different geographical area;

- First, second and third order effects of ICT: need for a methodology for assessing the net impact of ICT services and applications;
Online behaviours: individual and collective awareness of users, psychological ownership;

Language

English

Assessment Method

Oral exam. The exam will be the drafting of a scientific report, even a short one, about a subject of the course, and PowerPoint presentation describing the contents of the report with a consequent discussion and possible further questions on the topic

Presentation of a project where the student exploits the techniques and the concepts learned during the course

Bibliography

Teaching material provided by the lecturer.

Registration

Please, contact the teacher by email to register for the course

Schedule

Topic	Day	Time
ICT life cycle approach	05/02/2025	14:00-17:30
Operational emission: ICT use phase	12/02/2025	14:00-17:30
Estimating the carbon footprint of ICT	19/02/2025	14:00-17:30
ESG scheme – GHG protocol	26/02/2025	14:00-17:30
Future trends in ICT carbon emissions	05/03/2025	14:00-18:00

Exam schedule

Date	Where
To be defined	To be defined
To be defined	To be defined