



Sustainability Course

Smart-Edu4.0

Erasmus+ project



Co-funded by the
Erasmus+ Programme
of the European Union



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NETWORK MANAGEMENT & OPTIMAL DESIGN LAB



Sustainability - Course Description

This **Sustainability Course** is a comprehensive program designed to provide learners with a deep understanding of sustainability principles and practices.

The course is comprised of **ten PowerPoint presentations**, each covering a different aspect of sustainability. The course can be taken **as a cohesive program or as individual modules**.

Each presentation: 30-35 slides, duration 50-60 minutes

10 presentations → 10 hours course approximately



One of the objectives of the Smart-Edu4.0 project is “Embedding of sustainability as an integral part of the curricula with key principles derived from the UN Sustainable Development Goals in order to train the workforce of the future to have a mindset orientated towards environmental and social sustainability”.



<https://smartedu40.eu>



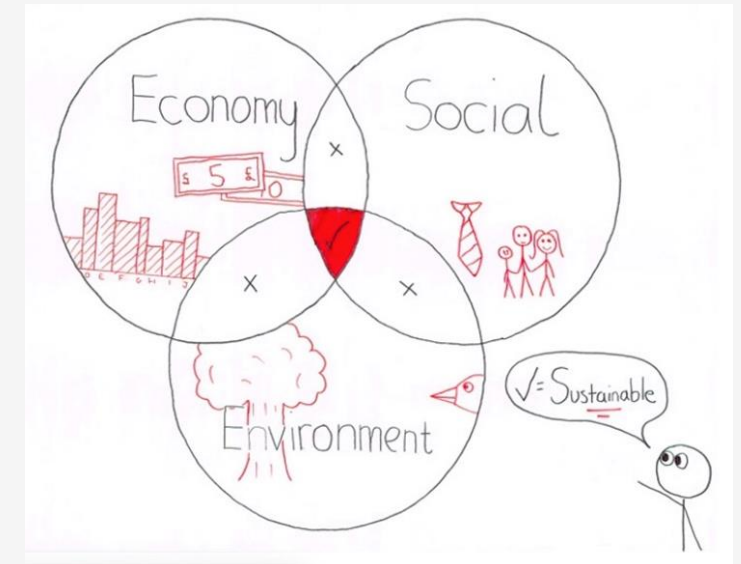
The 10 presentations on Sustainability

- 1 • What is Sustainability?  
- 2 • Millennium Development Goals (MDGs) - Sustainable Development Goals (SDGs)  
- 3 • Sustainability in Industry 4.0 
- 4 • How industry 4.0 can help to achieve SDGs? - Ceramic Industry Case Study 
- 5 • Sustainability Indicators and Performance Metrics 
- 6 • Sustainability and IoT - Part 1 
- 7 • Sustainability and IoT - Part 2 
- 8 • Sustainability and Mechatronics 
- 9 • Sustainability and Edge Cloud Computing 
- 10 • Sustainability and Agriculture and Food Technology 

Presentation 1. What is Sustainability?

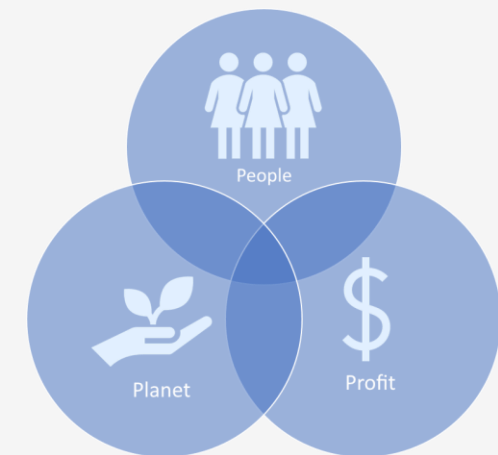
Sustainability is a term used to describe the ability to meet the needs of the present without compromising the ability of future generations to meet their own needs. Sustainability has three pillars: economic, social, and environmental.

The presentation, introduces learners to the fundamental concepts of sustainability, such as the triple bottom line (social, environmental, and economic sustainability), sustainable development, and the importance of a sustainable future for both current and future generations.



Other key notes on sustainability:

- inter-generational equity
- holistic approach.
- many ways to practice sustainability in our daily lives



Presentation 2. Millennium Development Goals (MDGs) – Sustainable Development Goals (SDGs)



The presentation highlights the MDGs and SDGs.

The MDGs and SDGs are two sets of global development goals that were developed by the United Nations to guide global efforts towards poverty reduction, sustainable development, and social equity.

Millennium Development Goals (MDGs)	Sustainable Development Goals (SDGs)
Adapted in 2000 and should be accomplished until 2015	Adapted in 2015 and should be accomplished until 2030
Concern developing countries	Concern ALL countries
8 goals, 18 targets, 48 indicators	17 goals, 169 targets, 230 indicators





Presentation 3. Sustainability in Industry 4.0

The presentation highlights the importance of sustainable practices in manufacturing and explores how Industry 4.0 can be used to achieve sustainability goals.

The benefits and drawbacks of Industry 4.0 are discussed. The application of Industry 4.0 to sustainable architecture, is presented. The presentation analyzes how:

Industry 4.0 affects to:

- raw materials,
- energy,
- products,
- waste,
- assets,
- information.



Sustainability offers opportunities to:

- reduce environmental impact,
- improve resource efficiency,
- promote a more sustainable economy.

Presentation 4. How industry 4.0 can help to achieve SDGs? - Ceramic Industry Case Study



Industry 4.0 can help to achieve the SDGs by enabling more efficient and sustainable production and consumption practices, reducing waste and emissions, promoting sustainable supply chains, facilitating collaboration and innovation.

The presentation focus on the intersection of I4.0 and SDGs.



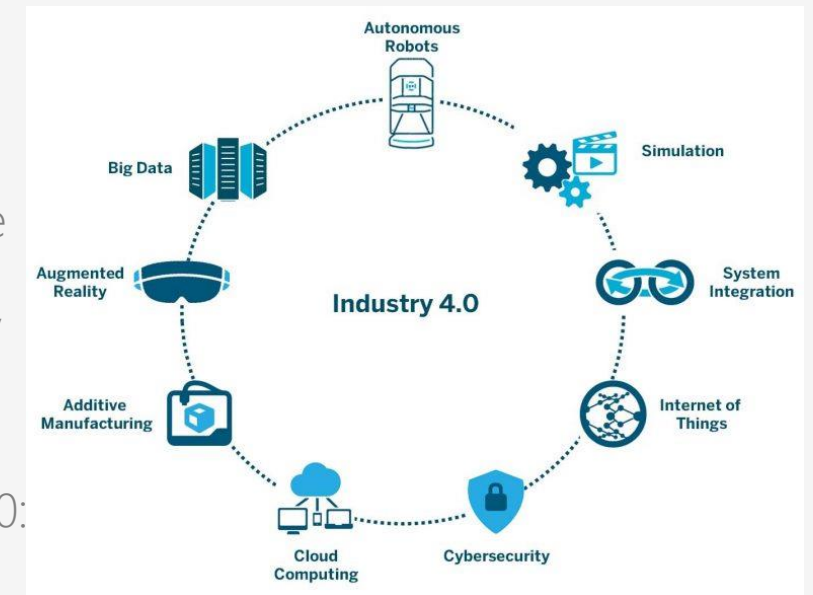
The presentation explores the technologies used in I4.0, which include, the IoT, robotics, additive manufacturing, cloud computing, big data and analytics.

Challenges associated with the adoption of I4.0:

- high cost of implementation
- potential job displacement.

Case study: manufacturing company in the ceramic industry.

Discussed economic impact of the company's adoption of I4.0, environmental impact, social impact.



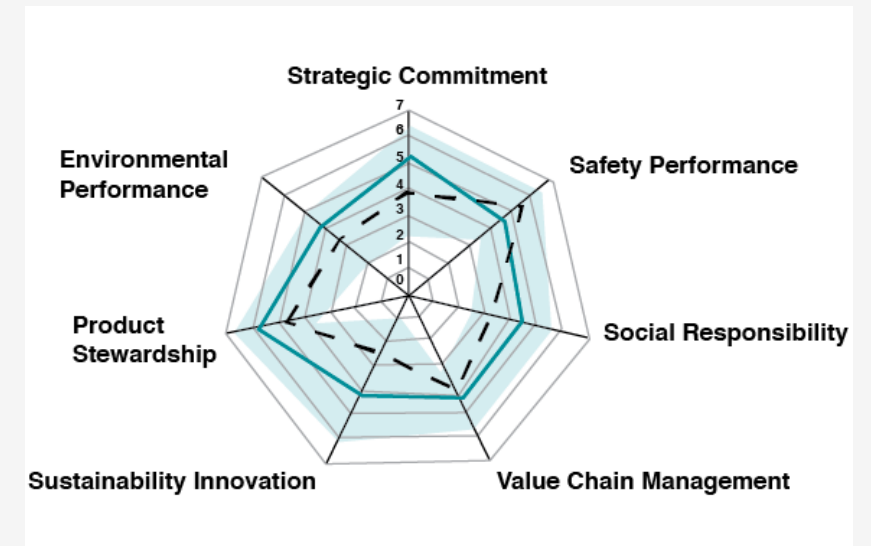


Presentation 5. Sustainability Indicators and Performance Metrics

Sustainability indicators and performance metrics [are essential tools for measuring and evaluating sustainability efforts](#). They provide a way to track progress, identify areas for improvement, and communicate sustainability performance to stakeholders.

The presentation

- focuses on the importance of measuring and monitoring sustainability performance metrics, particularly as they relate to the United Nations' MDGs and SDGs
- covers the use of indicators as a tool of measurement, their role in SDGs, and the characteristics of a good indicator.
- highlights sustainability reporting and reporting tools





Presentation 6. Sustainability and IoT - Part 1








The presentation begins by introducing the concept of IoT, along with the key factors for developing IoT applications and covers a wide range of topics related to the application of the IoT.

Discusses

- the use of sensors in IoT and their applications in various domains
- the importance of transforming data from IoT
- how sustainability and IoT can create connected technologies that contribute to a sustainable future.

Overall, the presentation provides an insightful overview of the role of IoT in sustainability and its potential to revolutionize the way we live, work, and interact with the world around us.



-  **Smart Buildings & Homes**
-  **Smart Energy**
-  **Smart Water**
-  **Smart Mobility**
-  **Smart Public Services**
-  **Smart Data Center**
-  **Smart Integration**



Presentation 7. Sustainability and IoT - Part 2



The presentation covers several aspects of IoT and its contribution to achieving SDGs. Presents various examples of IoT technology applications, such as smart city architecture, IoT-based solutions for ambient assisted living (AAL) domain, monitoring and tracking systems for patients with medical problems, RFID solutions IoT, block chain technologies for smart logistics.

Future directions in the field of IoT and sustainability are discussed.

IoT can play a vital role in promoting sustainability by optimizing energy use, reducing waste, promoting efficient transportation, and improving resource management.

IoT FOR SUSTAINABLE DEVELOPMENT

IoT Enables SDG





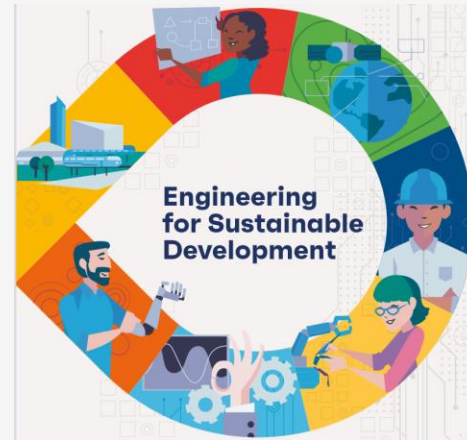
Presentation 8. Sustainability and Mechatronics

Sustainability and mechatronics are two areas that are increasingly interconnected.

The presentation highlights this relationship and presents applications.

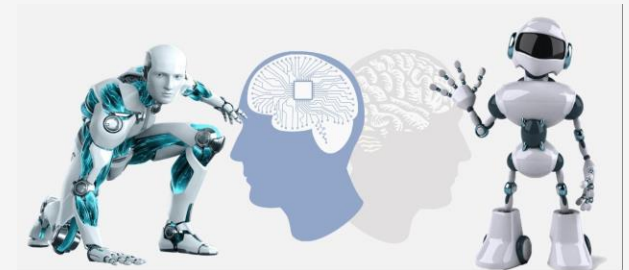
Relationship between sustainability and mechatronics in:

1. Energy Efficiency
2. Sustainable Materials
3. Renewable Energy
4. Smart Grids
5. Waste Reduction



Some applications

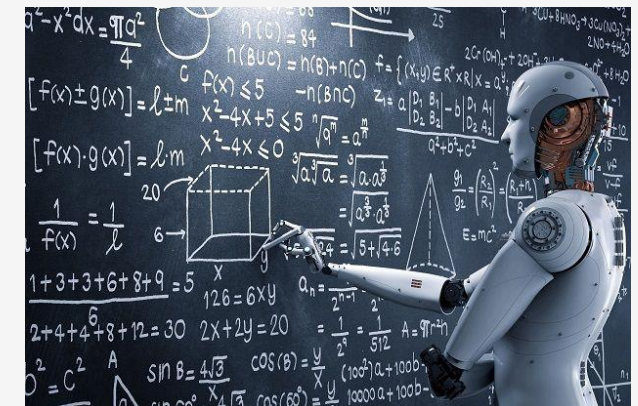
- Sport
- Robotics
- Home
- Medical
- Automobiles
- Transportation



What is Mechatronics?

- electrical engineering
- mechanical engineering
- electronics engineering
- information technology

Mechatronics can play a vital role in promoting sustainability by designing and developing intelligent systems and products that reduce energy consumption, promote the use of sustainable materials, support the use of renewable energy sources, and reduce waste.



Presentation 9. Sustainability and Edge Cloud Computing

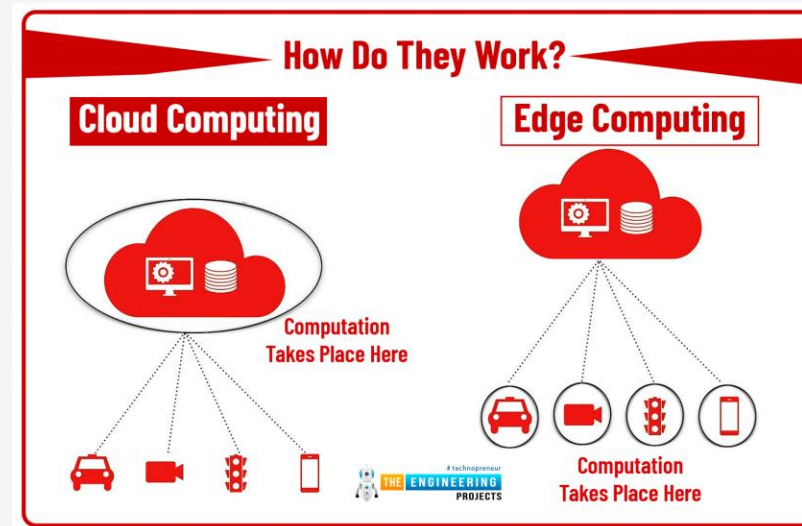
Edge cloud computing: the practice of using distributed computing resources located close to the devices and users

→ faster processing times, improved latency, and reduced bandwidth requirements.

The presentation covers topics on the relationship between sustainability and edge cloud computing and case studies.

Some topics on the relationship between sustainability and edge cloud computing:

- Energy Efficiency
- Renewable Energy
- Reduced Latency
- Smart Grids
- Reduced E-Waste



Case studies and applications

- smart cities
- sustainable agriculture
- face recognition
- self-driving cars
- autonomous robots



Benefits of adopting sustainable cloud computing practices are outlined.

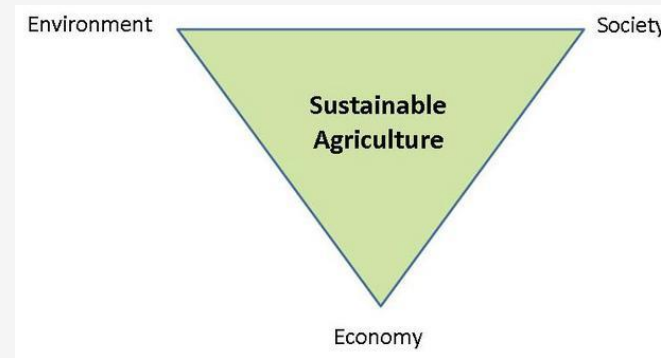
Challenges and limitations of using edge cloud computing for sustainability are discussed.



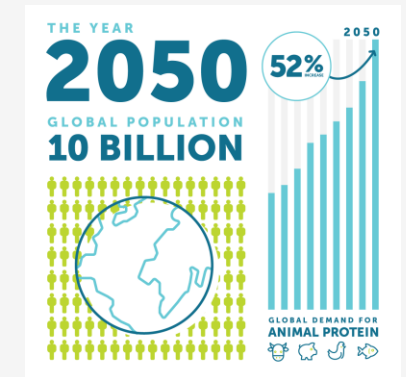
Presentation 10. Sustainability and Agriculture and Food Technology

The presentation focuses on how agriculture and food technology can play a vital role in promoting sustainability with:

- Sustainable Agriculture Practices
- Precision Agriculture
- Sustainable Food Processing
- Sustainable Packaging
- Food Waste Reduction
- Sustainable Supply Chain
- Plant-Based Alternatives
- Underutilized Ingredients



The adoption of sustainable agriculture and food technology practices is essential for achieving the UN SDGs related to food security, poverty reduction, climate action, and environmental protection.



Any questions?

Thank you 😊



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