CHALLENGES OF DECARBONIZING WORLD ECONOMY BY 2050

International MBA IMBA-EN SEP-2024 S-IBE

Area Economics

Number of sessions: 15

Term: Concentrations

Category: regular

Language: English

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PROFESSOR: JOSÉ MARÍA GARCÍA

José María García has been an Associate Professor at IE since 2002 and has an extensive leadership experience in innovation roles, launching and leading digital initiatives and developing circular platforms.

His professional experience has focused on the digital revolution, where he was an early leader since the Internet's early years while working at McKinsey and Company. He was also a co-founder of the pioneering internet incubator Netjuice and led Telecinco new media initiatives. Since 2006 he held international leadership positions at Google for more than 10 years, both at EMEA and globally. He has also contributed to impact initiatives such as Ashoka, the leading social entrepreneurship global network.

More recently he has been founder and CEO of Gratix, a circular mobile platform based on free sharing, with economic, social and environmental impact goals.

Currently he is focused on identifying and supporting high potential companies and initiatives to fight climate change and build a sustainable future for all. He is the author of the newsletter Verdades Incómodas (verdadesincomodas.substack.com), where he shares reflections to positively shape the future of the Planet leveraging technology, nature and our power as consumers, citizens and leaders.

Office Hours

Office hours will be on request. Please contact at:

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SUBJECT DESCRIPTION

Our future on Planet Earth is at stake because of climate change, an exponential threat to the balance with nature which has enabled mankind to thrive. Facing it requires decarbonizing the world economy in a short period of time.

To succeed, we need to unlock a massive wave of innovation in a short period of time, which will transform everything, an opportunity at least as enormous as the digital revolution. Rushed by a time bomb, because of the exponential nature of the impact of these changes on our ecosystem.

Decarbonizing the world by 2050 is both an urgent need and an enormous opportunity. Economy, finance, production and consumer society need to adjust to this change. As proven by the emergence of companies like Tesla and technologies such as solar energy, there will be clear winners among those providing the solutions to this challenge.

This process is not about long-term planning. It is about the significant challenges that major industries face today as they must adapt their production and business processes to new technologies that come with huge upfront investments and unknown risks.

Starting with the science behind greenhouse gases ?emissions and climate change, we will be sharing the broader picture of all factors impacting climate change, understanding how consumers, business and governments can drive a successful transition to a cleaner future leveraging the exponential power of nature and technology.

LEARNING OBJECTIVES

By completing this course, the students are expected to achieve the following learning objectives:

1. Understand the science behind GHG emissions and its impact on climate, both in terms of its drivers and potential evolution.

2. Scope the magnitude of the problem, its main drivers and what can be done to solve it.

3. Develop a broad understanding of the forces at play (consumers, industry, governments) and their key levers and actions to drive decarbonization.

4. Understand the key concepts and technologies behind these strategies, as well as the key initiatives and innovations driving them, and how they apply to different sectors and use cases.

5. Learn how policy makers, business leaders and society at broad can make decarbonization a reality with a constructive and positive approach.

TEACHING METHODOLOGY

IE University teaching method is defined by its collaborative, active, and applied nature. Students actively participate in the whole process to build their knowledge and sharpen their skills. Professor's main role is to lead and guide students to achieve the learning objectives of the course. This is done by engaging in a diverse range of teaching techniques and different types of learning activities such as the following:

Learning Activity	**Weighting**
Lectures	25.0 %
Discussions	15.0 %

Exercises in class, Asynchronous sessions, Field Work	10.0 %
Group work	30.0 %
Individual studying	20.0 %
TOTAL	100.0 %

AI POLICY

Specific use cases of GenAI are encouraged

Generative artificial intelligence (GenAI) tools may be used in this course for soecific use cases, e.g. primary research or initial problem surfacing, with appropriate acknowledgement. GenAI may not be used fior final deliverables, e.g. assignments, group submissions, exams.

If a student is found to have used AI-generated content inappropriately, it will be considered academic misconduct, and the student might fail the respective assignment or the course.

If you are in doubt as to whether you are using GenAI tools appropriately in this course, I encourage you to discuss your situation with me.
Suggested format to acknowledge the use of generative AI tools:

I acknowledge the use of [AI systems link] to [specify how you used generative AI]. The prompts used include [list of prompts]. The output of these prompts was used to [explain how you used the outputs in your work].

If AI was permited to use in your assignment, but you have chosen not to include any AI generated content, the following disclosure is recommended: No content generated by AI technologies has been used in this assignment.

PROGRAM

SESSION 1 (LIVE IN-PERSON)

Sustainability Topics:

- Environment

COURSE INTRODUCTION. STATE OF THE PLANET

Introduction to the course. Objectives, structure and methodology. Outcome expectations.

Our Planet as an interconnected system. Snapshot of an emergency. Anthropogenic Mass vs Living Biomass. Planetary Boundaries.

Sustainability, circular economy and regenerative economy. Linear vs exponential dynamics.

SESSION 2 (LIVE IN-PERSON)

Sustainability Topics:

- Environment

CLIMATE CHANGE: THE SCIENCE BEHIND. A DASHBOARD TO DECARBONIZE

The science behind greenhouse gas emissions (GHG) and anthropogenic climate change.

Global gameplan. IPCC/ COP key takeaways, frameworks and metrics. IPCC 6th Assessment Report (6AR). Sources of emissions and most polluting sectors. Key concepts: mitigation, adaptation.

Net Zero by 2050. International Energy Agency (IEA) scenario.

Climate change big picture: Emissions decarbonization framework & drivers: consumption, production, energy, nature, technical innovation, public policy.

SESSION 3 (LIVE IN-PERSON)

Sustainability Topics:

- Environment
- Economic Development

THE QUEST FOR SUSTAINABLE GROWTH: GDP & PROSPERITY. GREEN GROWTH. IS DEGROWTH EVEN FEASIBLE?

What's sustainable growth? Limitations of GDP. Triple Impact. Growth, wealth and prosperity.

Sustainable growth models and perspectives: Charles C. Mann, Kate Raworth, Jason Hickel, Tim Jackson, Andrew McAfee, Bjørn Lomborg.

The Abundance Economy. Dematerialization. Doughnut economics: Social foundation and economical ceiling. Degrowth theories. Potential alternatives. Green growth. Decoupling. Degrowth as a tool.

Case study: Mobility as an example: Substituting cars or thinking 10x?

SESSION 4 (LIVE IN-PERSON)

Sustainability Topics:

- Environment

DECARBONIZATION TECHNOLOGIES: ENERGY TRANSITION AND CLEANTECH

The energy puzzle: Carbon based vs renewable energies. Assessment per maturity cycle

Long term vs short term view. Geopolitical implications. Energy transition: Pace & pragmatic views. Other clean energy alternatives ie hydrogen, nuclear. Carbon management.

ClimateTech as a theme. Industry verticals: energy, transportation, food & land use, industrial, climate management, built environment and carbon.

SESSION 5 (LIVE IN-PERSON)

Sustainability Topics:

- Environment

ENERGY TRANSITION: ELECTRIFICATION, RENEWABLES & EFFICIENCY

Electrification, renewables and clean energy sources. Primary and final energy. Efficiency considerations. Impact per sector - ie transport, residential. Main challenges. Importance of continuity: Storage and batteries.

Case study or guest speaker

SESSION 6 (LIVE IN-PERSON)

Sustainability Topics:

- Environment

ENERGY TRANSITION: HARD TO ABATE INDUSTRIES

Alternative energy sources: Nuclear, hydrogen, biofuels. CCS. Electrons vs molecules. Impact per sector - ie industry, construction, transport. Technological maturity and risks.

Case study or guest speaker

SESSION 7 (LIVE IN-PERSON)

Sustainability Topics:

- Environment

CIRCULAR AND REGENERATIVE ECONOMY

Basic concepts: Linear vs circular models. Circulation vs take-make-waste. Circular Economy 3 principles. Butterfly Model. Technical and Biological cycle. Design Thinking and Circularity. Cradle to cradle. Era of R & Era of D. Practical applications.

SESSION 8 (LIVE IN-PERSON)

Sustainability Topics:

- Environment

APPLIED CIRCULAR ECONOMY: NEW CONSUMER FACING MODELS

Circular business models: sharing, marketplace, circular merchants, maintenance. Access vs ownership models. Logic per category - ie electronics, apparel, food.

On-demand platforms. Dematerialization, asset utilization & pay per use. From product to service. Regulatory issues.

Case study or guest speaker

SESSION 9 (LIVE IN-PERSON)

Sustainability Topics:

- Environment

APPLIED CIRCULAR ECONOMY: NEW INDUSTRIAL OPPORTUNITIES

Circular Industry Economy. Design criticality. Infrastructure implications.

Waste management and valorization. Biological cycle. Recycling. Waste as a Resource.

Case study or guest speaker

SESSION 10 (LIVE IN-PERSON)

Sustainability Topics:

- Environment

CARBON MANAGEMENT AND CLIMATE FINANCE

The need for carbon capture and removal technologies.

Nature based solutions. The value of Nature: Oceans, fertile soil, living beings.

Technology based solutions. Carbon capture and storage. DAC. Geoengineering.

Carbon credits & carbon offsets. Voluntary Carbon Markets (VCM). Carbon measurement and tracking. ESG. Impact vs compliance. Greenwashing.

Potential option: Case study or guest speaker

SESSION 11 (LIVE IN-PERSON)

Sustainability Topics:

- Environment

REGULATION AND PUBLIC POLICIES

Regulation and public policies as a key lever to shape industries and citizen action.

Multinational ecosystem behind global climate change negotiations.

Regulatory and market tools at hand for governments to promote zero-carbon technologies. Green industrial policies: Strategies from EU, USA, China and implications. Carbon tax. ETS. CBAM.

Impact on consumers. Anti-climate backlash. NIMBY. Learnings from incentives and adoption.

SESSIONS 12 - 13 (LIVE IN-PERSON)

Sustainability Topics:

- Environment

GROUP PROJECTS PRESENTATION

Class presentations and review of students projects.

SESSION 14 (LIVE IN-PERSON)

Sustainability Topics:

- Environment

REVIEW AND FINAL DISCUSSION

Class discussion based on course learnings towards 2050 potential scenarios.

Potential option: Case study or guest speaker

SESSION 15 (LIVE IN-PERSON)

Sustainability Topics:

- Environment

FINAL EXAM

Individual in-class exam.

EVALUATION CRITERIA

Grading will be determined by both final exam and group presentation, as well as class participation and preparation of some pre-class assignments.

Class participation is active participation with a good signal to noise ratio. Three main criteria will be used in reaching judgment about your class participation:

Depth and Quality of Contribution: The most important dimension of participation concerns what it is that you are saying.
Moving Your Peers' Understanding Forward: Great ideas can be lost through poor presentation. A high-quality presentation of ideas must consider the relevance and timing of comments, and the flow and content of the ensuing class discussion. It demands comments that are concise and clear, and that are conveyed with a spirit of involvement in the discussion at hand.
Frequency: Frequency refers to the attainment of a threshold quantity of contributions that is sufficient for making a reliable assessment of comment quality. The logic is simple: if contributions are too few, one cannot reliably assess the quality of your remarks. However, once threshold quantity has been achieved, simply increasing the number of times you talk does not automatically improve your evaluation.

criteria	**percentage**	**Learning Objectives**	**Comments**
Final Exam	30 %		
Group Presentation	30 %		

Individual pre-class work	20 %		
Class Participation	20 %		

FAILING GRADE AND REASSESSMENT

When students receive a Fail in a course, they have the opportunity to present themselves for reassessment in order to earn the necessary credits toward graduation.

The reassessment of students should be scheduled between 5 and 10 working days after the review session takes place.

Grades for the reassessment are limited to a Low Pass and Fail.

Both, the initial Fail as well as the grade of the reassessment remain on the transcript. For the purpose of calculating the GPA however, only the grade of the reassessment is to be considered. Students receiving a failing grade in the reassessment of a course will not be able to continue in the program.

BEHAVIOR RULES

Please, check the University's Code of Conduct here. The Program Director may provide further indications.

ATTENDANCE POLICY

Please, check the University's Attendance Policy here. The Program Director may provide further indications.

ETHICAL POLICY

Please, check the University's Ethics Code here. The Program Director may provide further indications.