

Seminars in Innovation and Sustainable Development

SYLLABUS

2022 / 2023

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Objectives of the Course

- The objective of the course is to provide an overview and a reflection on some key societal issues related with innovation and sustainable development
- Innovation in products, services, business models, organizational and institutional processes is the engine of economic development and societal change
- Sustainability is an integral part of development and must be seen as an opportunity rather than a burden
- Sustainability is no longer just about the environment, it encompasses all global challenges we face, including poverty, inequality, public health, access to education and healthcare, peace and social justice

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UN 2030 Sustainable Development Goals

- The original concept of sustainable development (UN Brundtland Report 1987), was simply the "ability to make development sustainable—to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs"
- SDGs (UN, 2015; <https://www.un.org/sustainabledevelopment/>) acknowledge that promoting prosperity must go hand-in-hand with strategies that build economic growth, reduce poverty, and address a range of social needs including education, health, social protection, and job opportunities, while tackling climate change and environmental protection
- Technology and innovation play a key role in achieving these goals

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UN 2030 Sustainable Development Goals



The Sustainable Development Goals Report 2022

<https://reliefweb.int/attachments/e254e6e0-129b-47de-aa97-3417dbda7f62/The-Sustainable-Development-Goals-Report-2022-compressed.pdf>

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Innovation & Sustainability

- Innovation processes do not follow a set sequence but rather emerge from complex systems involving many actors (scientists and engineers; firms; consumers; government; institutional rules, norms, and incentives)
- Innovation is mostly cumulative (built upon an established technological paradigm) and goes through several stages: invention, selection, production, adaptation, adoption, and replacement/retirement
- Each stage requires decisions from multiple actors whose incentives are not oriented by default towards sustainability
- Systemic changes require institutional reform through education, research, advocacy, policymaking, and financing

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Program: Seminar Topics

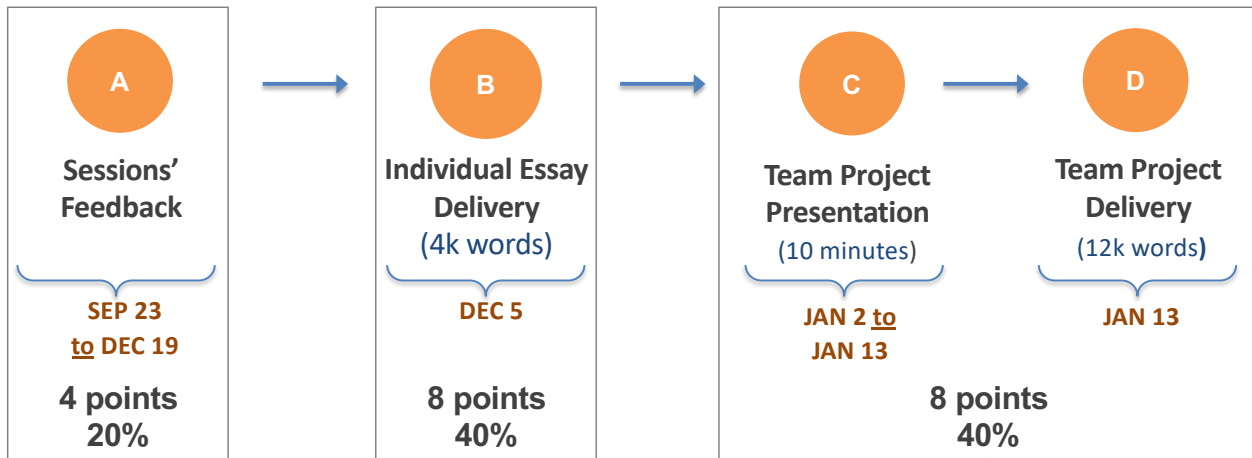
- Artificial Intelligence
- Blockchain Technologies
- Challenges of Ecosystem Management
- Climate Change: Facts, Trends and Extremes
- Coaching and Personal Credibility
- Corporate Social Responsibility
- Data Science for Social Good
- Digital Transformation and Industry 4.0
- Energy and Economic Growth
- From the Lab to the Market
- Innovation and Sustainability in Architecture
- Innovation and Sustainable Development: Basic Concepts
- Innovation Policy
- Knowledge for people, The planet and prosperity through partnerships
- Literature Reviews: Methods, Databases, Software
- Marine Litter and Microplastics
- Nanoscience and Nanotechnologies
- Nudge: the role played by cognitive technologies on Innovation
- The Strategic Approach of Research Institutions: Fraunhofer-Gesellschaft
- User Innovation in the Health Sciences



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Evaluation: Tasks/Dates/Grades

- **INDIVIDUAL ESSAY** – a review/survey of the literature on a wide-ranging subject concerning innovation and sustainable development (about 4,000 words plus bibliographical references) – 40% of final grade
- **TEAM PROJECT** – analysis of a current problem related with innovation and sustainable development, including: a final presentation and a written report (up to 12,000 words) – 40% of final grade
- **ATTENDANCE AND DISCUSSION** – including filling an online form assessing each session’s positives and negatives – 20% of final grade



6.1

Individual Essay

- 1. You must select a subject from the themes of the course's lectures, or pick a subject connected with the *UN Sustainable Development Goals*
- 2. Write a brief survey of the literature on the topic (about 4,000 words), supported by references to scientific papers
- 3. The survey should include:
 - a. Introduction/motivation: why the topic is important
 - b. Critical summary of the main studies and perspectives on the topic
 - c. Conclusion: your opinion on what research on the topic should focus on in the future
- 4. Subject should have been picked by 7 October– Lecture #3 will focus on access to academic sources and literature review methodologies
- 5. Essay to be handed in through Fenix by 5 December

6.2

Team Projects

- Students will be randomly assigned to teams of five people (31 October)
- Teams select a topic for their project (consider the subjects listed for the essay, as well as topics from previous editions of the course (see slide #7))
- The selected topic must be submitted for approval by the course coordinators through Fenix (before 21 November)
- Pitch presentation: a 5 minutes summary (no slides) of the project's objectives and expected results to be presented by each team (2 December)
- Final presentation of the team project, max. 10 minutes (2, 6, 9, 13 January)
- Project report to be handed in through Fenix (13 January)

6.3

Summary: Important dates



Evaluation	Task	Date
Feedback	Fill the online form every week/session	23 September to 19 December
Individual Essay	Define Subject (Fenix)	7 October
	Deliver Essay (Fenix)	5 December
Team Project	Professors create random teams	31 October
	Define Subject (Fenix)	21 November
	Pitch	2 December
	Present team project	2, 6, 9, 13 January
	Deliver Project (Fenix)	13 January

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Examples of Previous Team Project Topics

- Digital transformation in the mobility industry
- New trends in CO2 sequestration and valorisation
- Hydrogen energy: future perspectives and challenges
- Nano-sciences and nanotechnology products in the healthcare industry
- From Kyoto to Paris agreement: two contrasting countries
- Social responsibility programmes in large companies
- The sea, its resources and sustainability
- Transportation: future perspectives for its sustainability
- Sustainable reporting – sustainable companies? Performance evaluation
- National and/or regional water management: future perspectives
- Sustainable cities – two present contrasting examples, and trends
- The role of energy efficiency in a sustainable fourth industrial revolution

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Complementary information

- **Definition of mandatory activities:** Throughout the semester, compulsory presentation/delivery is required for all the tasks in order to finish the course.
- **Presentations:** If possible, all group members should present and participate in the discussions. Specific questions can be made to each group member during the discussion. The presentation files (up to 10 slides with minimum font size 15) should be delivered in PowerPoint (or similar) format before the presentations' date. Any additional information or detail deemed to be relevant should be included as a footnote in the PPT presentation.
- **Complaints and appeals:** All formal enquiries or complaints related with grades or evaluation system must be made in writing (which can include e-mail) up to one week after grades are published. The instructors will acknowledge the formal complaint in writing; respond within one week; deal reasonably and sensitively with each complaint; take action where appropriate.
- **Special Season:** Working-students and other students eligible for the special season (officially registered at IST Secretariat) have the possibility to deliver an individual Essay and an individual Final Report + Presentation. The Project should be significantly different of any business idea/report submitted during the semester by the student or his/her colleagues). The contents cover the same topics than non-working students. The Essay will account for 50% of the grade and the Final Report + Presentation/defence will account for the remaining 50%.

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Bibliography

- **United Nations (1987). *The Brundtland Report: Our Common Future*. World Commission on Environment and Development (<https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf>)**
- **International Council for Science & International Social Science Council (2015).**
- **Review of Targets for the Sustainable Development Goals: The Science Perspective (<https://council.science/wp-content/uploads/2017/05/SDG-Report.pdf>)**
- **Wackernagel, M., & Rees, W. (1998). *Our Ecological Footprint: Reducing Human Impact on the Earth*. New society publishers.**
- **Anadon, L.D., et al. (2016). *Making technological innovation work for sustainable development*. *Proceedings of the National Academy of Sciences*, 113(35), 9682- 9690 (<https://www.pnas.org/content/pnas/113/35/9682.full.pdf>)**
- **Silvestre, B. S., & Țîrcă, D. M. (2019). *Innovations for sustainable development: Moving toward a sustainable future*. *Journal of Cleaner Production*, 208, 325-332 (<https://www.sciencedirect.com/science/article/pii/S0959652618329834>)**
- **Azapagic, A., Perdan, S., & Clift, R. (Eds.). (2004). *Sustainable Development in Practice: Case Studies for Engineers and Scientists*. John Wiley & Sons.**
- **OECD (2004). *Science and Innovation Policy – Key Challenges and Opportunities*. (<https://www.oecd.org/science/inno/23706075.pdf>)**
- **Fagerberg, J., Mowery, D. C., & Nelson, R. R. (Eds.). (2005). *The Oxford Handbook of Innovation*. Oxford university press.**
- **Joyce, R., & Xu, X. (2019). *Inequalities in the Twenty-first Century*. Institute for Fiscal Studies. (<https://dera.ioe.ac.uk/33419/1/The-IFS-Deaton-Review-launch.pdf>)**

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SCHEDULE 2022/2023 1º Semester

Hour	Monday	Tuesday	Wednesday	Thursday	Friday
8:00-8:30					
8:30-9:00					
9:00-9:30					
9:30-10:00					
10:00-10:30					
10:30-11:00					
11:00-11:30					
11:30-12:00					
12:00-12:30					
12:30-13:00					
13:00-13:30					
13:30-14:00					
14:00-14:30					
14:30-15:00					
15:00-15:30	Prof.				
15:30-16:00	Filipa Ribeiro				
16:00-16:30					
16:30-17:00					
17:00-17:30					
17:30-18:00					
18:00-18:30	SIDS				
18:30-19:00	GA4				
19:00-19:30					
19:30-20:00					

**Prof.
Filipa Ribeiro**

**Prof.
Miguel Amaral**

SIDS

GA4

SIDS

GA4

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