PARIS CLIMATE SCHOOL

Master in Ecological Transition, Risks and Governance

COURSE DESCRIPTIONS

CORE COURSES

Fundamental Course: Geopolitics and climate resources	
Main Teachers	**Laurence Tubiana,** Doyenne de la Paris Climate School **Emmanuel Guerin,** Vice-Doyen de la Paris Climate School
Summary	The course will provide **theoretical foundations** for analysing climate and resources through a geopolitical lens. It examines climate change and resource constraints as forces that transform the core categories of international relations, rather than as additional policy domains. Drawing on the main schools of thought in international relations—realism, liberal institutionalism, constructivism, as well as critical and postcolonial approaches—the course unpacks and redefines key concepts such as power, sovereignty, security, national interest, legitimacy, and interdependence. Attention is paid to how the climate crisis and climate action redefine power—who holds it, how it is exercised, and through which material, economic, regulatory, and ideational instruments—as well as how they reshape the definition and defence of the national interest under conditions of long-term risk and uncertainty. The course also explores the role of ideas, scientific knowledge, values, and norms in shaping geopolitical strategies and legitimizing policy choices. Building on these foundations, the course then adopts **geographical and thematic perspectives** to examine how climate and resource geopolitics play out in practice. It analyses the evolution of global climate and resource governance, from early multilateral negotiations to the Paris Agreement and beyond, as well as the growing fragmentation of the international order. Particular attention is paid to the strategies of major powers (the United States, China, and the European Union), emerging economies, and vulnerable states; to the geopolitics of energy systems and critical minerals; to climate finance and North–South relations; and to the security implications of both the climate crisis and climate action. The course also examines the political consequences of climate action itself—industrial competition, trade tensions, technological races, and the strategic use of interdependence in a decarbonizing and resource-constrained world—inviting students to critically assess the prospects for cooperation, competition, and conflict in the decades ahead.
Learning outcomes	By the end of this course, students will be able to: ● Demonstrate a solid understanding of the main theories and concepts of international relations and mobilize them to analyse climate change and natural resources as central drivers of contemporary geopolitics. ● Analyse how the climate crisis and climate action reshape power relations and the national interest, identifying the material, economic, regulatory, and ideational instruments through which power is exercised in a decarbonizing and resource-constrained world. ● Apply a structured analytical framework to examine the intersections between climate policy, resource management, trade, industrial strategy,

	and security in a fragmented international order and an increasingly weaponized global economy. • Critically assess the role of ideas, scientific knowledge, values, and norms in shaping geopolitical strategies, legitimizing policy choices, and structuring cooperation and conflict around climate and resources. • Conduct informed geopolitical analysis of concrete cases, involving major powers, emerging economies, and vulnerable states, using methods and standards relevant to academic research. Translate theoretical and analytical insights into policy-relevant and strategic assessments, equipping students to engage with real-world decision-making in the fields of climate, resources, and international affairs.
Fundamental Course: Macroeconomics & Political Economy of the Ecological Transition	
Main Teachers	**Lucas Chancel**, Professor of Economics, Sciences Po **Jean Pisani Ferry**, Economist and Director of Bruegel **Luiz Awazu Pereira da Silva**, Economist, former Deputy General Manager of the Bank for International Settlements and a former Deputy Governor of the Central Bank of Brazil.
Summary	The Master's program includes two distinct and complementary courses on economics: Macroeconomics and Political Economy of the Ecological Transition. The first course, Political Economy of the Ecological Transition, is taught during the first semester by Lucas Chancel. The second course is Macroeconomics, is taught during the third semester by Jean Pisani-Ferry and Luiz Awazu. Together, these two-course sequence offers a coherent and progressive framework for understanding the ecological transition—encompassing climate change, biodiversity loss, and pressures on natural resources—both as a macroeconomic challenge and as a political economy process of structural transformation. The first course examines the political economy and sociology of the ecological transition. It focuses on power relations, distributional conflicts, institutional dynamics, and questions of legitimacy arising from climate, biodiversity, and resource policies. Attention is paid to inequalities, including spatial inequalities, and to the political economy of different policy instruments across sectors. The course also offers a concise intellectual history of economic thinking on environmental and ecological issues, tracing the evolution of the discipline from a predominantly microeconomic focus (externalities, intertemporal optimisation, natural resource economics) toward a macroeconomic perspective centred on investment, innovation, and structural change. It situates contemporary debates on growth, green growth, and degrowth within this broader analytical framework. The second course focuses on the macroeconomic foundations of ecological policy. It examines the core macroeconomic concepts and variables relevant to the ecological transition, including growth, inflation, employment, trade, public finances, investment, innovation, and macroeconomic stability, in a context defined by global commons constraints. Building on this analytical foundation, the course introduces the main macroeconomic modelling frameworks used to analyse climate, biodiversity, and resource transitions, highlighting their

	assumptions, strengths, and limitations. It then analyses climate and ecological shocks and their macroeconomic consequences and examines how the main instruments of macroeconomic policy—monetary, fiscal, and macroprudential—must evolve to manage these shocks and enable the transition. Particular attention is paid to policy coordination and to the tensions between short-term stabilisation objectives and long-term structural transformation. Taken together, these two courses equip students with the analytical tools needed to assess ecological transition strategies that are both macroeconomically coherent and socially just, and capable of securing durable political and societal support.
Learning outcomes	Upon completion of this course, students will be able to: ● Analyse climate change as both a macroeconomic shock and a structural, long-term constraint, shaping growth trajectories, inflation, labour markets, and overall macroeconomic stability. ● Evaluate how physical risks, transition risks, and uncertainty propagate through the economy, affecting aggregate outcomes and the functioning of key economic systems. ● Assess the macroeconomic implications of mitigation, adaptation, and climate damages in an integrated manner, understanding the trade-offs and complementarities between different climate policy approaches. ● Reason about the interactions between fiscal, monetary, industrial, and trade policies in a climate-constrained world, and judge whether climate strategies are macroeconomically consistent and resilient. ● Interpret macroeconomic evidence, scenarios, and policy documents related to climate change, and engage critically in debates on low-carbon transition pathways. ● Apply political economy frameworks to analyse how power relations, interests, and institutions shape climate policy choices, transition trajectories, and implementation challenges. ● Assess climate policies from a distributional, social-acceptability, and legitimacy perspective, understanding how inequalities—within and across countries—condition political support or resistance. ● Evaluate and design climate policy instruments that are both economically sound and politically robust, incorporating insights on governance, institutions, and stakeholder dynamics. Understand the political economy of international climate cooperation and contribute thoughtfully to domestic and global policy debates on climate action.
Fundamental Course: Legal stakes for the planet	
Main Teacher	**Laurent Neyret**, Professor of Private Law and Criminal Sciences (agrégé, 2011), and Full Professor at Sciences Po
Summary	In the context of the ecological emergency we are going through, what can the law do? This is the question the course seeks to address. In today's context of ecological and climate crisis, many forces are being mobilised to confront what is surely the greatest existential challenge of this first quarter of

	the century. Law lies at the heart of possible solutions: the Paris Agreement, climate litigation, the legal status of nature, corporate social responsibility (CSR), the duty of vigilance, specialised courts, the crime of ecocide, the rights of future generations, the Habitability Principle, and more. Major transformations are underway, and understanding the fundamental principles of law is essential to grasping the stakes of environmental governance. The purpose of this course is to provide the key legal and judicial concepts needed to respond to the ecological emergency, enabling students to operate effectively in any role that directly or indirectly engages with these issues. The course is organized into 12 sessions, some of which will feature guest speakers.
Learning outcomes	• **Master the Core Principles and Frameworks of Environmental Law** Solid grasp of the principles, concepts, legal regimes, and institutions that structure environmental law at national, regional, and international levels. • **Critically Assess the Evolution of Legal Tools in the Anthropocene** Capacity to analyse emerging legal innovations—such as rights of nature, commons-based governance, and the Habitability Principle—and evaluate their transformative potential. • **Analyse Climate Litigation and Its Impacts** Ability to identify key actors, strategies, and outcomes in global climate litigation and understand its growing influence on public and private climate commitments. • **Navigate International Environmental Law and Global Governance** Understanding of the strengths, weaknesses, and future trajectories of international environmental law, including its role in addressing transboundary ecological challenges. • **Evaluate Environmental Responsibility, Liability, and Enforcement** Competence in identifying ecological harm, understanding liability mechanisms, and examining criminal, civil, and administrative responses to environmental damage and environmental crime. • **Assess Legal Responsibilities of Enterprises and Market Actors** Capacity to interpret and apply corporate environmental obligations—ICPE, ESG, CSR, due diligence, reporting—and to analyse greenwashing, sustainability claims, and contractual or competitive implications.

Fundamental course: Societies and transition	
Main Teachers	**Giacomo Parinello**, Associate Professor, Sciences Po **Sophie Dubuisson Quellier**, Director of research, CNRS, HDR, Director of the CSO, Sciences Po
Summary	What does “transition” mean? How do societies change their relationship to the natural world? This course seeks to answer these questions by combining insights from history, sociology, and other social sciences. It will be structured in three parts. The notion of transition presupposes discontinuity, and we talk about it because we are living in a time of global crises. The course will thus first investigate the concepts involved in such conversations, including period, epoch, event, crisis, and transition. This includes examining the spatial and temporal scales that arise when using these categories and concepts (in geology, a “crisis” can last for millennia; in archaeology, several centuries, etc.), as well as the political conditions and implications of their use. Once these elements have been established, the course will examine the relationships between the construction of modern societies and the natural world, with a focus on energy, pollution, and resource use. The transformation of social relationships with the natural world in the modern era is the closest analogue to a “transition” we have. At the same time, it constitutes the baseline from which twenty-first-century societies should “transition” out of to address the planetary crises. The third part of the course shifts the focus to the present and concentrates on the major challenges of today's transitions, showing how they are determined, now as in the past, by issues of social organization, inequality, and institutions. It will show that the very definition of the problems to be solved is not self-evident, that the problems lie beyond just consumption or lifestyle issues, and that thinking about transitions today implies entirely reorganizing our societies.
Learning outcomes	Through this course, students will understand that transitions are fundamentally social problems. They will gain an advanced understanding of the fundamental concepts and categories mobilized in public debates and scholarly circles to think about transitions and their overlapping political and temporal registers. They will also become familiar with multidisciplinary research on the foundational features of the society-nature relationship in the modern era, an indispensable body of knowledge for acting in the present and planning for the future. Last but not least, they will become familiar with the latest research on the core social challenges at the heart of any possible transition.

Fundamental course: Political theory in times of climate change	
Main Teachers	**Pierre Charbonnier**, CNRS Researcher at Sciences Po
Summary	Climate change is the product of a deeply embedded system of thought, institutions, and infrastructures. Since the seventeenth century, State legitimacy and the idea of progress have been closely associated with scientific inquiry, technological development, and material expansion. The current ecological crisis therefore, inevitably calls into question the political legacy of modernity. Is the process of modernisation coming to an end, or must it be reinvented? How could the modern utopia of shared prosperity and equality generate such a monumental planetary backlash? This course provides a detailed account of how modern State formation, shared conceptions of justice, and models of economic growth have coincided with ecological interventions justified by the need to combat scarcity, control territories, secure property, and expand productivity. Beneath the foundations of modern political thought lie persistent anxieties about resources and an ideal of environmental control, which have culminated in contemporary controversies and dilemmas surrounding sustainability and the governance of planetary commons. The emergence of an ecological critique of modernization and progress must be situated within this historical context. The rise of “the environment” and “climate” as critical categories is multifaceted, and multiple regimes of contestation coexist globally. Ideals of pristine nature, efforts to combat waste and inefficiency, struggles for ecological justice, and forms of resistance to science and technology must all be examined as complex and ambiguous legacies of modernity. In the twenty-first century, the global ecological crisis has become a central concern for states and the international community. Geopolitical and economic fractures, financial structures, technological innovation, and new visions of the future and of democracy all contribute to a critical debate that reshapes the conceptual grammar inherited from modern times. Through a constant back-and-forth between past and present, and between theory and concrete political practice, this course maps and analyses the contemporary planetary controversy.
Learning outcomes	The students will be made familiar with the fundamentals of political theory, enriched by the latest advances in environmental and economic history. We will focus on the student’s autonomous ability to read and discuss difficult and technical texts from the modern canon, to establish bridges between theory, history and knowledge structures. The main outcome of the course would be the availability to decipher the day-to-day controversies and conflicts around climate and ecology as expressions of underlying conceptual, ideological, and institutional structures.

SPECIALIZATION TRACKS

Specialization course: Financing the Transition	
Scientific Advisor	**Jean Boissinot**, Director of Studies and Risk Analysis at the ACPR (*Autorité de contrôle prudentiel et de résolution)*, and Secretary General of the Network for Greening the Financial System (NGFS)
Summary	Finance is a key enabler of structural transformation in the economy. As such, it has an important role to play in the transition toward a net-zero and climate-resilient economy. However, developments since the Paris Agreement and its art. 2.1.c) calling for "climate consistent financial flows" have been hampered by two seemingly opposite attitudes. Some have imagined that the private financial sector could be the main engine of the transition, substituting for climate policy and climate action effectively falling short of their advertised ambition. Others have suggested that green or sustainable finance was mostly an advertising gimmick, the trend of a moment to be ridden for commercial purpose. This specialization takes a foundational approach, revisiting a wide range of traditional finance courses to combine them with a climate and nature perspective. The specialization pursues three main objectives: - To **equip students with strong and broad foundations in finance with a built-in understanding of how to embed climate and nature considerations** within this framework. Through a series of modules, the specialization revisits most of the usual finance courses (financial intermediation, corporate finance, financial markets, insurance, etc.) against planetary boundaries and a transition perspective. - To **develop students' analytical skills through a variety of actual case studies to allow them to turn foundational knowledge into practical know-how**. The specialization combines foundational modules with thematic modules, exposing students to "transition issues" and exploring approaches to finance them. - To **enable students to develop a "system perspective" and a better grasp at how to leverage on finance for the transition**. Rather than a piecemeal approach based on rather specialised knowledge, the specialization aims at providing the students with a broad perspective to understand how various techniques and initiatives can work together for finance to find its place in a "whole of the economy" transition. At the end of the specialization, students will have acquired knowledge of green and sustainable finance and understanding of its potential and limitations enabling them to engage effectively with financial institutions and public decisions-makers on both policy and projects. The specialization equips students with the knowledge and analytical skills required to pursue careers in green and sustainable finance, across both public and private financial institutions.

Learning outcomes	By the end of the course, students will be able to: - **Understand the potential limitation of green and sustainable finance**, its contribution to the transition toward net zero and climate resilient economies and its complementary nature with climate policy and climate action in other fields. - **Apply core analytical framework relevant to a wide range of finance-related issues** from financial intermediation and corporate finance to financial markets or insurance. - **Critically evaluate real-world cases of "climate-focused" financial instruments, products or deals**, using appropriate academic knowledge, practical insights and policy relevant perspectives. - **Explain how art. 2.1.c) of the Paris Agreement can be implemented** in various public and private contexts and across advanced, emerging and developing economies by providing actual and effective examples of such implementation. **Design effective solutions to various problems related to the financing of the re-embedding of our economies within the planetary boundaries** with both practical relevant and a system perspective and be able to engage with project sponsors, investors and relevant financial institutions, public decision-makers (with either climate or financial perspective).
Specialization course: Value-Chains and Industrial Transformations	
Scientific Advisors	**Katell Le Goulven,** Adjunct Professor of Strategy at INSEAD **Guido Schmidt-Traub,** Partner, Systemiq Ltd.
Summary	The Value Chains and Industrial Transformations specialisation is designed to equip students with the analytical, strategic, and practical skills needed to understand and transform the real economy in the context of climate change, biodiversity loss, and growing resource constraints. The primary objective of this specialisation is to ensure graduates' employability in both the public and private sectors and provide them with the skills to create their own companies. It prepares students for careers in public administrations and institutions dealing with economic, industrial, energy, agricultural, and trade policy, as well as for roles in companies, consulting firms, and organisations involved in supply chains management and industrial strategy. The specialisation enables students to analyse how value chains and industrial systems function, how they are shaped by technological, economic, social, and political forces, and how they can be transformed to align with climate, biodiversity, and resource objectives. Particular emphasis is placed on the interaction between public policy and private decision-making, and on the active role of society in the co-construction and implementation of transformation pathways. Across three semesters, the specialisation follows a clear progression. Students move from foundational analytical frameworks to in-depth sectoral

	transformations and finally to strategic decision-making in public and private contexts. Case studies are integrated throughout the programme and play a central role in connecting analytical tools to real-world transformation challenges.
Learning outcomes	By the end of the Value Chains and Industrial Transformations specialisation, students will be able to: ● Identify and analyse how industrial systems and value chains function, and how they are shaped by technological, economic, social, and political dynamics under climate, biodiversity, and resource constraints. ● Analyse the transformation of key economic systems, including energy, industry, transport, and agri-food systems, using sector-specific and cross-cutting analytical frameworks. ● Assess the role of critical raw materials, minerals, land, and ecosystems in shaping industrial competitiveness, resilience, and sustainability. ● Evaluate corporate strategies for transforming value chains, including supply diversification, investment choices, and risk management in a resource-constrained world. ● Analyse public strategies and policy instruments for industrial transformation, including industrial policy, trade policy, public procurement, standards, regulation, and coordination mechanisms. ● Integrate social, political, and territorial dimensions into the analysis of industrial transformation, recognising the role of collective action, labour, and local actors in co-constructing and implementing transition pathways. ● Produce policy-relevant and strategy-oriented analyses applicable to careers in public administration, industry, consulting, and international organisations
Specialization course: Adaptation, Risks and Resilience	
Scientific Advisor	**Christophe Buffet,** Adaptation Research Officer, Agence Française de Développement (AFD) **Vivian Dépoues,** Research Lead – Adaptation to climate change, Institute for Climate Economics (I4CE) **Mélody Braun,** Climate risk management expert **Stéphane Hallegatte,** Chief Economic Adviser for Climate at the World Bank Group
Summary	The Adaptation, Risks and Resilience specialisation track equips students to diagnose climate vulnerability and risk as outcomes of socio-economic, technical and political processes, and to design robust, systemic adaptation pathways. It treats adaptation not as a catalogue of technical fixes, but as a contextual and iterative process, shaped by competing priorities, power dynamics and institutional constraints across actors and scales, grounded in the analysis of structural vulnerabilities. It emphasizes integrated approaches that combine multi-level governance, co-construction, and decision-oriented mechanisms to navigate trade-offs, address implementation bottlenecks, and reflect equity, legitimacy, and political economy realities, particularly in Global South contexts.

	Students will develop competencies to work across project- and system-level analysis, deploy specific operational tools, apply decision-making under deep uncertainty, and mobilise financing for resilience at different scales. They will learn to navigate interactions between public and private actors, and to situate adaptation within national and subnational public policy debates as well as international negotiations and climate finance architecture. Across three semesters, the specialisation follows an integrated progression: 1. **Foundations — Understanding current and future climate Risks, Vulnerability, and Adaptation.** Climate data literacy (scenarios, models, projections), impact chains and cascading uncertainties, risk and vulnerability frameworks, sectoral explorations (cities, water and agriculture, infrastructure, etc.), adaptation economics, maladaptation diagnosis, and career orientation through practitioner engagement. 2. **Strategies — Adaptation Planning, Governance, and Operational Tools.** Multi-level adaptation governance, national and sub-national adaptation policies, foresight analysis, dynamic adaptation pathways, sectoral governance on value chains and transboundary climate risks, measuring adaptation (GGA, qualitative and quantitative approaches), financial instruments as governance tools , private-sector risk disclosure and tools, gender and just adaptation, and public-private dialogue. 3. **Frontiers — Residual Risk, Transformation, and New Horizons.** Hard and soft limits of adaptation, Loss and Damage, transformational adaptation, crisis management and cascading risks, insurance and risk transfer (parametric instruments, sovereign risk pools, contingent finance), the Global South as adaptation leaders and reverse knowledge flows, climate mobility, AI and emerging technologies, adaptation in international negotiations, and capstone integration. Each semester systematically combines foundational concepts, sectoral applications, operational tools, and practitioner perspectives. At the end of the specialisation, students will have acquired the analytical frameworks and practical know-how enabling them to engage effectively with governments at national and local levels, international organisations, development banks, the private sector, and civil society on adaptation policy, climate risk, and resilience. The specialisation prepares graduates for careers in public administration (including Ministries of Finance), international organisations (UNFCCC, World Bank, UNDP, GCF), development finance institutions, the insurance and reinsurance sector, corporate climate risk management, consulting, think tanks, and research.
Learning outcomes	By the end of the specialisation, students will be able to: • Assess and diagnose climate and disaster risks • Critically interpret climate information and services derived from data and models • Conduct sectoral adaptation analysis • Design, compare, and appraise adaptation pathways

	• Deploy operational tools and financial instruments for adaptation • Diagnose and design adaptation governance architectures • Measure and evaluate adaptation progress • Critically assess the limits of adaptation • Operate effectively across the disaster-adaptation-recovery continuum • Engage with the emerging frontiers of adaptation

Interdisciplinary Reading Seminar	
Main Teacher	**Manisha Anantharaman,** Assistant Professor, Sciences Po
Summary	The interdisciplinary reading seminars are designed as a space of shared inquiry at the heart of the Paris Climate School, supporting dialogue across core courses and specialisation tracks, while developing a common conceptual vocabulary for the program. Working through a curated set of texts, students explore climate, nature, biodiversity, and other key objects of ecological transition and environmental governance from multiple disciplinary perspectives–the social sciences but informed by the natural sciences, humanities and the arts. They will compare and contrast how these issues are constructed and engaged by different knowledge traditions. By linking different forms of knowledge and disciplinary perspectives that are often studied in isolation, the seminar will develop the interdisciplinary critical thinking capacities essential to assess the systemic interdependencies of society-environment relations. The seminar cultivates habits of critical thinking and informed, reflexive action, equipping students to understand complex socio-ecological systems, navigate trade-offs, and contribute to the transformation of societies under conditions of ecological constraint. During the seminars, students engage actively with readings from the fundamental courses while complementing them with additional influential texts. The first two semesters focus on discussion-driven, reading-centered inquiry, encouraging careful analysis, synthesis, and evaluation of evidence and argumentation. The third semester emphasizes creative writing practices, enabling students to develop as effective communicators of complex systems and change, translating insights from critical reflection into forms suitable for scholarship, policy, and public engagement.
Learning outcomes	The interdisciplinary environmental reading seminars will pursue the following learning outcomes: 1. **Share inquiry and collaborative dialogue**

	Shared inquiry is the act of reasoning together about common texts, questions, and problems. The seminar will advance students' abilities to develop and pursue meaningful questions in collaboration with others, even in the context of confusion, paradox, and/or disagreement. Through the habits of shared inquiry students will carefully consider and understand the perspectives and reasoned opinions of others, reconsider their own opinions, and develop rhetorical skills. Students will be able to: • Formulate and advance probing questions grounded in textual and empirical evidence, and • Engage in sustained, collective inquiry that deepens and broadens perspectives • Practice inclusive, respectful, and critically engaged discussion across disciplinary and cultural differences **2. Interdisciplinary critical thinking** Critical thinking in this program is grounded in the process of analysis, evaluation, and synthesis required to engage deeply with texts and arguments from diverse disciplinary and interdisciplinary perspectives. Through careful reading, attentive listening, and reflective consideration, students will develop the capacity to assess multiple, and often competing, frames of inquiry. Students are encouraged to question the assumptions and authority of each source, while reflecting on the foundations of their own reasoning. Students will be able to: • Develop systematic strategies to map the key threads of scholarly and public debates surrounding a complex question • Evaluate evidence rigorously, assessing sources for assumptions, credibility, context and relevance • Draw well-supported conclusions based on comprehensive exploration of evidence and consideration of alternative perspectives. **3. Oral and written communication**

THEMATIC COURSE

THEMATIC COURSE: Earth System & Interdependencies	
Main Teacher	**Jonathan F. Donges, Deputy lead**, Potsdam Institute for Climate Impact Research **Torsten Albrecht, Lead researcher, Earth Resilience Science Unit (ERSU),** Potsdam Institute for Climate Impact Research
Summary	The *Earth System Science* course builds on the pre-term modules in climate science and biodiversity science and is designed to provide an integrated, systems-level understanding of Earth system dynamics. It introduces students to the structure and functioning of the Earth system as a coupled set of physical, chemical, and biological processes, with particular attention to feedbacks, non-linearities, and cross-scale interactions across the atmosphere, hydrosphere, and biosphere. A central component of the course is a detailed examination of the planetary boundaries framework, which defines a safe operating space for humanity based on critical thresholds in key Earth system processes. The course reviews the scientific basis, quantification, and current status of these boundaries - including climate change, biosphere integrity, land-system change, freshwater use, and biogeochemical flows - while also addressing issues of boundary interactions, tipping dynamics, uncertainty, and ongoing methodological debates in the literature. The course aims to equip students with a rigorous scientific foundation that can be mobilized in the analysis of socio-economic transformations. By grounding students in Earth system constraints and risks, it enables them to critically assess policy, governance, and economic strategies in light of biophysical limits. The course will be developed and delivered in partnership with the Potsdam Institute for Climate Impact Research (PIK).
Learning outcomes	• Explain the structure and functioning of the Earth system as an integrated set of physical, chemical, and biological processes, including interactions among the atmosphere, hydrosphere, and biosphere. • Analyse feedback mechanisms, non-linear dynamics, and cross-scale interactions that govern Earth system behaviour and contribute to complex environmental change. • Evaluate the scientific foundations of the planetary boundaries framework, including its conceptual basis, key indicators, and methods of quantification. • Assess the current status and trends of major planetary boundaries—such as climate change, biosphere integrity, land-system change, freshwater use, and biogeochemical flows—using scientific evidence. • Critically examine uncertainties, tipping points, and interactions between Earth system processes, including ongoing debates and methodological

	limitations in the literature. ● Apply Earth system science principles to socio-economic and policy contexts, enabling critical evaluation of governance strategies and economic models within biophysical limits.

THEMATIC COURSE : Communication, disinformation and power dynamics	
Main Teacher	**Mélusine Boon- Falleur**, Assistant Professor, Sciences Po
Summary	Climate governance increasingly unfolds in an environment where information is abundant, contested, and politicized. While scientific knowledge remains indispensable to understanding climate change and guiding policy choices, it no longer operates in a neutral or authoritative space. Instead, climate-related information circulates through fragmented media systems, digital platforms, and polarized public debates, where competing narratives, interests, and values shape how evidence is interpreted, trusted, or rejected. This course examines communication not simply as a technical skill, but as a core dimension of power in the climate transition. It explores how information is produced, framed, and mobilized by different actors, and how communication strategies influence agenda-setting, coalition-building and legitimacy. Particular attention is given to the rise of climate disinformation and delay strategies, and to the ways in which they exploit uncertainty, emotion, and institutional mistrust to shape public debate and policy outcomes. The course adopts an interdisciplinary perspective, drawing on insights from political science, sociology, media studies and cognitive sciences, while remaining accessible to students without prior training in communication or media analysis. It is structured around two complementary dimensions.
Learning outcomes	By the end of this course, students will be able to: ● Explain the role of information and communication in contemporary climate politics, including the shift from expert-driven decision-making to contested public arenas shaped by narratives, framing, and perception. ● Analyse communication as a dimension of power, identifying how different actors use information, narratives, and media ecosystems to influence public debate, policy processes, and stakeholder expectations.

	• Critically assess climate-related information and disinformation, understanding the mechanisms, incentives, and impacts of misinformation, strategic doubt, and polarization. • Apply analytical frameworks to real-world communication cases, evaluating credibility, legitimacy, framing choices, and strategic trade-offs. • Design a coherent and context-sensitive communication strategy for a climate-related case, including audience targeting, message development, channel selection, and anticipation of opposition. • Communicate complex climate-related information effectively, adapting content to diverse audiences and institutional contexts while maintaining scientific integrity and ethical standards.

THEMATIC COURSE: Technology, Innovation & Engineering Literacy	
Summary	Technological innovation plays a critical role in responses to climate change, but it should not be understood in isolation. The deployment of climate technologies depends on complementary forms of innovation—organizational, social, financial, and political—that shape how technologies are developed, adopted, and governed. This course adopts an interdisciplinary perspective to examine technological innovation as one component of broader transformation processes, while deliberately focusing on the specific role, limits, and potential of technology in the climate transition. **Objectives** The course pursues three main objectives: • **To enable students to identify and understand the major categories of climate-related technological innovations**, both in terms of decarbonization and adaptation, within the main systems of the transition (energy, agriculture and food, transport, buildings, industry, and cities). The aim is not to delve into the technical details of each solution, but to provide a clear and understandable overview of the technological options that are currently shaping climate pathways. • **To equip students with the tools to understand how innovation occurs** within companies, startups, industrial ecosystems, and research systems, as well as the economic, organizational, and financial conditions that allow an innovation to move from the laboratory to the market and then to scale. • **To train students in contemporary innovation policy instruments** by analysing how states, public institutions, and private actors design and implement climate innovation strategies through funding, regulation, public procurement, public-private partnerships, and industrial policies

Learning outcomes	By the end of this course, students will be able to: • **Identify and classify the main families of climate-related technological innovations**, in both mitigation and adaptation, across the major systems of the climate transition (energy, agriculture and food, transport, buildings, industry, and cities), without requiring advanced technical or scientific training. • **Explain how technological innovation emerges, diffuses, and scales**, by analysing the respective roles of firms, start-ups, research systems, financial actors, and innovation ecosystems, from early research to market deployment. • **Apply core analytical frameworks to assess innovation dynamics**, including economic incentives, organizational structures, financial conditions, and infrastructure constraints that shape technological change in the context of the climate transition. • **Analyse the instruments and strategies of innovation policy** and assess how governments and public institutions interact with private actors through funding mechanisms, regulation and standards, public procurement, public–private partnerships, and industrial policy to steer climate-related innovation. • **Critically evaluate real-world cases of technological innovation for climate**, using appropriate academic standards and policy-relevant criteria to assess feasibility, scalability, and systemic impact. • **Communicate effectively across disciplines and professional contexts**, demonstrating sufficient technological literacy to engage with entrepreneurs, investors, and public decision-makers, and to translate analytical insights into policy- or strategy-oriented outputs.