UNIVERSITY OF OREGON | Global Education Oregon

SYLLABUS

HOW GREEN IS AI?

Instructor: Michael Jordan, Professor of Practice, Lundquist College of Business; Director, Center for Sustainable Business Practices

Language of Instruction: English

UO Credits: 4

Contact Hours*: 40 [confirm against final program calendar]

Total Hours of Student Engagement in all course activities*: 80–100

Level: 300 — for business majors, this course counts as an upper division elective; open to all majors; no business prerequisites

DUBLIN, IRELAND

COURSE DESCRIPTION

Artificial intelligence is often described as though it lives in the cloud — weightless and everywhere at once. It does not. And as much as it feels like a consequence-free software tool that can help any organization be more efficient, every AI model runs on machines that occupy land, draw electricity, consume water, and depend on decisions made by utilities, regulators, and communities.

This course puts students in Dublin, home to the European headquarters of much of the global technology industry and one of the densest concentrations of data centers in the world, to examine what AI actually demands from the places that host it. Through site visits, guest experts, and applied analysis, students build a systems-level understanding of AI's environmental and social footprint, evaluate competing claims from companies, regulators, and communities, and develop a framework for making — and defending — risk-informed decisions about AI use, transferable to an Oregon context.

COURSE OBJECTIVES

The course will:

- Situate personal and organizational AI use within the physical systems — data centers, energy, water, hardware, and labor — that make AI possible.
- Use Dublin and Ireland as a living case study in the tension between technology-led economic development and infrastructure, resource, and community limits.
- Expose students directly to the institutions and individuals shaping the response to AI's growth: infrastructure operators, regulators, policy voices, researchers, and civil-society advocates.
- Build students' capacity to evaluate contested, self-reported evidence and make a defensible risk–reward judgment under uncertainty.
- Translate lessons from a mature data-center market (Ireland) to an emerging one (Oregon).

Student Outcomes. Students who successfully complete this course will:

- Map the AI system — from individual and organizational use through data centers, energy, water, hardware, labor, and communities — and explain how local impacts aggregate globally.
- Explain Dublin's role as a technology and data-center hub and how this growth interacts with Ireland's economic-development model, infrastructure capacity, and sustainability goals.
- Assess AI's environmental and social impacts using systems thinking, relevant scientific evidence, and metrics (including PUE, WUE, and their limits), and place personal AI use in context with other everyday activities.
- Evaluate organizational responses to AI-related sustainability risks, including the credibility of company disclosures, mitigation efforts, offsets, and AI-for-sustainability claims.
- Develop organizational AI-use risk guidelines using a risk-analysis method.

INSTRUCTIONAL METHODOLOGY

This course is taught through an integrated sequence of faculty-led seminars, site visits, guest-expert sessions, and applied fieldwork rather than through a fixed lecture schedule. Class time combines direct instruction with structured debriefs before and after each excursion, so that students arrive at each site prepared with a framework and leave able to analyze what they observed.

- Faculty-led seminars introducing frameworks (e.g., systems mapping and risk analysis) that anchor each week's fieldwork.
- Site visits and academic excursions to data-center and energy infrastructure, EirGrid and/or the Commission for Regulation of Utilities (CRU), and/or water-system operators, and/or Dublin's applied-AI and startup community.
- Guest-expert sessions, e.g., with one or more of: energy regulators, policy voices, researchers, and civil-society advocates.
- An overnight academic excursion to Galway, home to Ireland's largest operational onshore wind farm, providing an energy-system contrast to Dublin.
- Integration studios in which students convert field observations into structured business and policy analysis.
- A final capstone in which student teams apply a risk management framework to an organization’s context to create a recommendation for “responsible AI use” policies or guidelines.

METHOD OF EVALUATION (GRADING)

Assessment is built around one substantive piece of work supported by ongoing formative assessment.

- Field Notebook and Reflections — 30%
  - Structured reflections after each site visit and guest session, linking observation to course frameworks.

- Participation and Engagement — 30%
  - Preparation, attendance, and active engagement across seminars, site visits, and guest sessions.
- Final Capstone Project and Presentation — 40%
  - Team-based FMEA-informed corporate AI-Use Risk Guidelines, applied to an Oregon case, culminating in a final risk–reward judgment presented on site.

Grades follow University of Oregon standards:

- A+ = 97-100%
- A = 94-96.9%
- A- = 90-93.9%
- B+ = 87-89.9%
- B = 84-86.9%
- B- = 80-83.9%
- C+ = 77-79.9%
- C = 74-76.9%
- C- = 70-73.9%
- D = 60-69.9%

COURSE OUTLINE

Week 1 — Basic Context: The Growth of AI and How to Evaluate Environmental Impact

- Seminar: Understand the growth of AI use — why individuals and organizations use AI; the AI ecosystem; systems mapping from personal AI use through infrastructure, resources, labor, and communities.
- Seminar: Understand how to evaluate environmental impact — an environmental-health and social-wellness framework; how to understand and assess impacts.
- Three-day excursion to the Galway region (Thursday departure, Sunday return): academic core includes IDA Ireland, the Galway Wind Park and nature hike, and SSE Renewables, alongside cultural exploration such as Connemara, Kylemore Abbey, and the Cliffs of Moher.
- Readings:
- Assignment: Field Notebook entry 1 — personal AI-use system map.

Week 2 — AI's Physical Infrastructure and Ireland's Renewable Energy Growth

- Seminar: Map AI technology to its physical infrastructure — data centers, cloud computing, hardware and supply chains; energy generation; water systems; and land use; introduction to PUE/WUE and what infrastructure metrics fail to reveal.
- Seminar: How Ireland has grown its renewable-energy portfolio in the context of decades of tech-industry growth — electricity demand, grid capacity, renewable procurement, power purchase agreements, and 24/7 carbon-free-energy claims.
- Site visit: EirGrid — grid capacity, interconnection, and regulation.

- Guest speaker: SSE Renewables — a project-finance and power-purchase-agreement perspective on renewable procurement for data centers.
- Full-day excursion: Bog of Allen Nature Centre and a second site (TBD) — land use and ecological context alongside energy and infrastructure development.
- Integration studio: Reconciling grid-operator, financier, and land-use accounts of Ireland's infrastructure and energy growth.
- Readings:
- Assignment: Company / Site Analysis assigned; Field Notebook entry 2

Week 3 — How AI Technology Companies Address Environmental Sustainability Responsibilities

- Seminar: Company sustainability commitments and disclosures; cooling systems and water withdrawal versus consumption, local water stress, and WUE; reduction, mitigation, offsetting, and risk-shifting; claims–evidence analysis of what companies say versus what evidence supports.
- Guest speaker: Water-systems perspective on data-center demand and local water stress.
- One-day excursion: Google data-center visit and an Amazon/AWS waste-heat-reuse district-heating site — two companies' differing approaches to environmental responsibility.
- Integration studio: Comparing company and water-utility accounts of the same resource questions.
- Readings:
- Assignment: Field Notebook entry 3.

Week 4 — Community Impacts, Public Regulation, and Corporate Governance for Responsible AI

- Seminar: Community impacts — data labeling, content moderation, and supply-chain labor; data-center siting, land use, noise, backup generation, and community disruption; who benefits, who bears the burdens, and who participates in decisions.
- Seminar: Public regulation — Irish and EU infrastructure, climate, disclosure, and planning policy compared with US and Oregon approaches.
- Guest session: policy voice, researcher, or civil-society/community perspective from Dublin's applied-AI community.
- Seminar: The need for corporate governance to define and achieve responsible AI use — identification and prioritization of AI-related risks; introducing corporate AI-Use Risk Guidelines, carried forward into the capstone.
- Readings:
- Assignment: Company / Site Analysis due; Field Notebook entry 4.

Week 5 (Departure Week) — Final capstone work / presentations

- Seminar: Departure week: Final capstone workshop and presentations (Corporate AI-Use Risk Guidelines applied to an Oregon case)

COURSE READINGS

NOT YET FINALIZED

A finalized reading list with page numbers will be distributed before the program begins. Readings will draw on journalism, industry and company sustainability disclosures, and policy documents. Representative themes include:

- AI infrastructure, energy demand, and grid capacity (EirGrid, IEA, and other sources)
- Data-center water use and local water stress in Ireland and comparable US markets
- Corporate sustainability disclosures and 24/7 carbon-free-energy claims from major hyperscalers
- Irish planning, energy, and climate policy relevant to data-center development
- AI-for-sustainability case studies and rebound-effect literature
- Systems thinking

We will draw material from the not yet published book:

Benoit, N. (n.d.). How green is AI?

BIBLIOGRAPHY

To be provided later

Academic Misconduct

The University Student Conduct Code (available at conduct.uoregon.edu) defines academic misconduct. Students are prohibited from committing or attempting to commit any act that constitutes academic misconduct. By way of example, students should not give or receive (or attempt to give or receive) unauthorized help on assignments or examinations without express permission from the instructor. Students should properly acknowledge and document all sources of information (e.g. quotations, paraphrases, ideas) and use only the sources and resources authorized by the instructor. If there is any question about whether an act constitutes academic misconduct, it is the students' obligation to clarify the question with the instructor before committing or attempting to commit the act. Additional information about a common form of academic misconduct, plagiarism, is available at https://researchguides.uoregon.edu/citing-plagiarism.

Generative AI Course Policy

Because this course is itself an analysis of AI's costs and benefits, students are expected to use generative AI tools thoughtfully, critically, and with full transparency — not to avoid using them. Students may use AI tools to support research, brainstorming, and drafting, but any AI-generated content (text, data summaries, images, or analysis) used in an assignment must be clearly cited and attributed. AI output can be inaccurate, incomplete, dated, or reflect the very unexamined claims this course teaches students to

interrogate; students are responsible for critically evaluating anything an AI tool produces before relying on it. Undisclosed or uncritical use of AI that violates the University Student Conduct Code will negatively affect grades. Questions about appropriate use should be directed to the instructor. See also the UO's sample generative AI course policies at https://teaching.uoregon.edu/teaching-and-generative-ai-course-policy-and-activity-ideas#policies.

Accessible Education

The University of Oregon and I are dedicated to fostering inclusive learning environments for all students and welcomes students with disabilities into all of the University's educational programs. The Accessible Education Center (AEC) assists students with disabilities in reducing campus-wide and classroom-related barriers. If you have or think you have a disability and experience academic barriers, please contact the AEC to discuss appropriate accommodations or support. Visit 360 Oregon Hall or aec.uoregon.edu for more information. You can contact AEC at 541-346-1155 or via email at uoaec@uoregon.edu.

Reporting Obligations

I am a designated reporter. For information about my reporting obligations as an employee, please see Employee Reporting Obligations on the Office of Investigations and Civil Rights Compliance (OICRC) website. Students experiencing sex- or gender-based discrimination, harassment or violence should call the 24-7 hotline 541-346-SAFE [7244] or visit safe.uoregon.edu for help. Students experiencing all forms of prohibited discrimination or harassment may contact the Dean of Students Office at 541-346-3216 or the non-confidential Title IX Coordinator/OICRC at 541-346-3123 to request information and resources. Students are not required to participate in an investigation to receive support, including requesting academic supportive measures. Additional resources are available at investigations.uoregon.edu/how-get-support.

I am also a mandatory reporter of child abuse. Please find more information at Mandatory Reporting of Child Abuse and Neglect.

Pregnancy Modifications. Pregnant and parenting students are eligible for academic and work modifications related to pregnancy, childbirth, loss of pregnancy, termination of pregnancy, lactation, and related medical conditions. To request pregnancy-related modifications, students should complete the Request for Pregnancy Modifications form on the OICRC website. OICRC coordinates academic and other modifications for pregnant and parenting students to ensure students can continue to access their education and university programs and activities.