

Indian Institute of Technology Kanpur
Kotak School of Sustainability

Proposal for a new course

Course Title: Sustainability of AI

Course No: KSS 6XX

About the course: The Sustainability of AI theme can encompass a broad range of topics and concerns related to the environmental, social, ethical and economic impacts of Artificial Intelligence (AI).

Participating Departments for floating the course: KSS, ChE

Possible Proposers: Ashutosh Sharma (ChE)

Faculty members interested in teaching: Sachchida Nand Tripathi (CE and SEE)

Who can take the course: Ph. D, M. Tech., B. Tech, M.Sc. students

Units: 3-0-0-9 [9 credits]

Prerequisite: None

Course Contents:

Some key areas of focus include:

The Sustainability of AI theme can encompass a broad range of topics and concerns related to the environmental, social, ethical and economic impacts of Artificial Intelligence (AI). Some key areas of focus include:

Environmental Sustainability

1. Energy consumption: AI systems' significant energy consumption and contributions to greenhouse gas emissions.
2. E-waste generation: Electronic waste generated by AI-related hardware and infrastructure.
3. Resource depletion: Potential depletion of rare earth minerals and other resources required for AI development.

Social Sustainability

1. Bias and fairness: Ensuring AI systems are fair, unbiased, and respectful of diversity.
2. Job displacement: Mitigating the impact of AI-driven automation on employment and job markets.
3. Social manipulation: Preventing AI-powered social manipulation and disinformation.

Economic Sustainability

1. Value creation: Ensuring AI-driven value creation benefits all stakeholders, including workers and local communities.
2. Wealth concentration: Preventing AI-driven wealth concentration and promoting equitable economic growth.
3. Regulatory frameworks: Developing regulatory frameworks to promote sustainable AI development and deployment.

Governance and Accountability

1. Transparency and explainability: Ensuring AI systems are transparent, explainable, and accountable.
2. Regulatory oversight: Establishing regulatory oversight mechanisms to ensure AI development and deployment align with sustainability principles.
3. Public engagement and participation: Fostering public engagement and participation in AI decision-making processes.

Human-Centered AI

1. Human-AI collaboration: Designing AI systems that augment human capabilities and promote human-AI collaboration.
2. Human values and ethics: Ensuring AI systems align with human values and ethics.
3. Inclusive design: Developing AI systems that are accessible, usable, and inclusive for diverse populations.

Research and Development

1. Sustainable AI research: Encouraging research on sustainable AI development, deployment, and impact assessment.
2. AI for sustainability: Exploring AI applications that support sustainability, such as climate change mitigation and environmental monitoring.
3. AI literacy and education: Promoting AI literacy and education to ensure stakeholders understand AI's potential and limitations.

References

1. Bashir, N. et al. (2024) 'The Climate and Sustainability Implications of Generative AI', An MIT Exploration of Generative AI [Preprint], doi:10.21428/e4baedd9.9070dfe7.
2. Osburg, T. (2017). Sustainability in a digital world needs trust. In Sustainability in a digital world: new opportunities through new technologies (pp. 3-19). Cham: Springer International Publishing. https://www.thomasosburg.de/wp-content/uploads/2021/12/Sustainability_in_a_Digital_World.pdf
3. Guandalini, I. (2022) 'Sustainability through digital transformation: A systematic literature review for research guidance', Journal of Business Research, 148, pp. 456-471. Available at: <https://doi.org/10.1016/j.jbusres.2022.05.003>.
4. Vacchi, M., Siligardi, C., Demaria, F., Cedillo-González, E.I., González-Sánchez, R. and Settembre-Blundo, D. (2021) 'Technological sustainability or sustainable technology? A multidimensional vision of sustainability in manufacturing', Sustainability, 13(17), p. 9942. Available at: <https://doi.org/10.3390/su13179942>
5. Huang, Y. (2021) 'Technology innovation and sustainability: challenges and research needs', Clean Technologies and Environmental Policy, 23, pp. 1663–1664. Available at: <https://doi.org/10.1007/s10098-021-02152-6>

Dated: 17th April 2025

Signature of Proposer



Prof. Ashutosh Sharma



Prof. Sachchida Nand Tripathi

Dated: 17/4/2025



DUGC/DPGC Convener, KSS

The course is approved/ not approved

Chairman, SUGC/SPGC

Dated: _____