

Computer Science Department INU

Specific Courses on Sustainability and SDGs

To directly address the Sustainable Development Goals, dedicated courses or electives can be introduced or adapted in the computing curriculum. These courses can either be full degrees focusing on technology and sustainability or individual elective courses that address key aspects of the SDGs.

1. Full Degree Programs in Computing with Focus on Sustainability

- **MS in Data Science with an Emphasis on Sustainability** (aligns with SDG 4, SDG 9, and SDG 13)
 - The **MS Data Science** program can integrate courses and specializations focused on data-driven decision-making for sustainability initiatives. Specific courses like **Big Data Analytics** and **Machine Learning** can be used to analyze environmental data, urban planning datasets, and renewable energy systems to improve sustainability.
 - The focus on **statistical and mathematical methods** for data science can be expanded to address sustainability issues like environmental monitoring, water management, and optimizing agricultural practices.
- **MS in Information Security with Social Impact** (aligns with SDG 16)
 - The **MS Information Security** program can add modules on securing social and governmental information systems to enhance trust in public institutions, which is essential for strong and just institutions. This aligns with SDG 16 (Peace, Justice, and Strong Institutions) by focusing on the protection of critical data and infrastructure from cyber threats.

2. Elective Courses Specifically Targeting Sustainability and SDGs

- **Artificial Intelligence for Social Good** (aligns with SDG 3, SDG 4, and SDG 11)
 - This elective could focus on using AI to solve health-related problems (e.g., disease detection and public health monitoring), personalized education (for SDG 4), and managing urban services like traffic and waste management to promote sustainable cities (SDG 11).
- **Green Computing** (aligns with SDG 7, SDG 12, and SDG 13)
 - A dedicated elective course in **Green Computing** could focus on the development and use of computing systems in an energy-efficient manner. It would cover topics such as reducing power consumption, designing software with minimal resource usage, and using cloud computing for efficient data storage and processing. This would directly address SDG 7 (Affordable and Clean Energy), SDG 12 (Responsible Consumption and Production), and SDG 13 (Climate Action).

- **Technology and Environmental Sustainability** (aligns with SDG 6, SDG 13, and SDG 15)
 - This elective course could teach students how technology can be used to monitor natural resources, improve water quality, and contribute to conservation efforts. Topics could include IoT for water management (SDG 6), data modeling for climate change impacts (SDG 13), and using geospatial data for biodiversity conservation (SDG 15).
- **Social Impact of Computing** (aligns with SDG 10, SDG 16, and SDG 17)
 - An elective course focusing on the **Social Impact of Computing** could cover how technology affects different segments of society, with an emphasis on reducing inequality (SDG 10), promoting justice through transparent data systems (SDG 16), and building partnerships to achieve sustainable goals (SDG 17). This course could also include a component on accessibility and inclusion, ensuring that technologies are designed to serve all users, including marginalized communities.
- **Blockchain and Sustainable Development** (aligns with SDG 9 and SDG 12)
 - Blockchain technology can be explored for improving supply chain transparency and responsible consumption (SDG 12). This elective course would cover the basics of blockchain, its applications in enhancing the efficiency of supply chains, and how it can contribute to sustainable economic models (SDG 9).
- **Human-Computer Interaction (HCI) for Accessibility and Inclusivity** (aligns with SDG 4 and SDG 10)
 - A dedicated HCI course can include modules focused on designing systems that are accessible to people with disabilities, thereby reducing inequalities (SDG 10). It could also include user-centered design principles aimed at creating educational tools to promote equitable access to quality education (SDG 4).

3. Integration of SDGs into Existing Courses

- **Software Engineering for Sustainable Development** (aligns with SDG 9 and SDG 11)
 - The existing **Software Engineering** course could include a module focusing on software development projects that contribute to sustainable development. This could involve developing applications that improve urban services (e.g., waste management, traffic management) or support innovative industries.
- **Information Security and Ethical Computing** (aligns with SDG 16)
 - **Information Security** courses can be expanded to cover topics related to ethical computing and the role of secure information systems in fostering transparent and just institutions, contributing to SDG 16 (Peace, Justice, and Strong Institutions).

4. Capstone Projects and Practical Engagement with SDGs

- The **Final Year Project** can be made mandatory for students to align their projects with one of the SDGs, ensuring practical engagement with real-world sustainability problems. Examples could include:
 - Developing an AI-based healthcare system to support SDG 3 (Good Health and Well-being).

- Creating a data visualization platform to track and analyze climate change data (SDG 13: Climate Action).
- Building a blockchain-based supply chain system to ensure responsible consumption (SDG 12).

5. Workshops and Specialized Courses

- Universities could offer short-term workshops or specialized courses focused on **Technology for Sustainability**. These courses could be cross-disciplinary and available to students from all faculties, encouraging them to learn about how their computing skills can be applied to solve sustainability challenges.