



SDG 11: Sustainable Cities and Communities

MAKE CITIES AND HUMAN SETTLEMENTS INCLUSIVE, SAFE, RESILIENT AND SUSTAINABLE

The institute has undertaken numerous activities and initiatives to promote sustainable development in each of the three major domains: economic, environmental and social). IIT Gandhinagar has implemented several campus development projects that demonstrate sustainability in the site and building designs. Activities corresponding to each of the four broad components of research, education, outreach and operations in the theme of sustainable cities and communities are summarised below.

Research

Extensive research activities are conducted at the institute to address challenges of urbanisation, including air quality and distribution of reactive traces, wastewater reclamation and treatment technologies, linking travel pattern with covid-19 outbreak in urban setting, flood depth and exposure mapping, covid-19 pandemic preparedness and early warning, solid waste management, sewer network, urban water management strategies, urban green spaces, flood evacuation during pandemic, clean energy and resource recovery, energy effective smart city applications among others.availability, among others. More than 30 researchers at the institute work in these areas. Some of the ongoing research projects in this sphere are mentioned below.

- AI and sensor networks for air-quality monitoring; Science and Engineering Research Board (SERB)
- Assessing the concentration and sources of indoor VOCs and particulate matter (PM) in urban India and comparing to levels in China and the US; DUKE University
- Cultural heritage preservation and restoration using digital 3D models; SERB
- Development of low-cost, efficient and scalable materials for CO₂ capture using naturally available non-toxic stable materials and industrial solid waste; Department of Science and Technology (DST), Government of India
- Development of a sliding bearing for earthquake protection of structures; DST
- Development of environmentally and economically sustainable composite solution for municipal solid waste management; Ministry of Education
- Drives for electric vehicle applications; SERB
- ECO-WET - Efficient Coupling Of Water and Energy Technologies for smart sustainable cities; Indo-German Science and Technology Centre

- Gandhipedia: A one-stop AI-enabled portal for browsing Gandhian literature, life events and social network; National Council of Science Museum, Ministry of Culture
- Geosynthetic-reinforced soil walls and abutments for high-speed railway systems; High Speed Railways Innovation Centre
- High sensitive detection of atmospheric pollutant gases to monitor the effects of industrial emissions on urban air quality; Gujarat Council of Science and Technology
- Impact of air pollution on Covid-related secondary exacerbations; Google
- Impact of sea-level fluctuations, climate change or tectonic activity on the decline of the Harappan settlement of Dholavira, Kutch, India; DST
- Indigenous cultural heritage as a facilitator for SDGs; Flinders University
- Investigating the exposure to airborne pollutants and risk of airborne transmission of pathogens in built environments; internally funded
- Materials for sustainable and energy efficient buildings; Ministry of Education
- Novel laser-based monitoring of key environmental parameters – addressing well-being, livelihood and a healthier environment in developing regions of India; RAE
- Sewage disposal and management at high altitude areas; Army Technology Board
- Synthesis of magnetic catalyst-coated microbubbles for removal of trace pollutants; DST
- The effects of reverse migration on indigenous communities following India's covid-19 induced lockdown; Social Science Research Council
- UAV-based laser spectroscopic monitoring of greenhouse gas emissions in urban and rural India; Royal Academy of Engineering (RAE)
- Vulnerability assessment and sustainable solutions for water quality management in the urban environment; DST
- Water for change: Integrative and fit-for-purpose water sensitive design framework for fast-growing livable cities; DST

MICOB is a start-up incubated by IIEC that provides products related to the construction industry. It develops 3D concrete printing blocks that use the least energy and material and minimises waste reduction, thus leading to a substantial decrease in the carbon footprint and emissions. It was among the teams shortlisted under Global Housing Technology Challenge 2019 and has received a seed grant of Rs 20 lakhs for its startup idea.

Education

A short course on 'Active Tectonics & Earthquake Geology: A tool for Seismic Hazard Assessment' was conducted by Prof Javed N Malik, Professor, Department of Civil Engineering, IIT Kanpur, from September 21- 30, 2020.

5th edition of IKS course: IITGN started the 5th edition of its unique elective course, Introduction to Indian Knowledge Systems (IKS), online on January 13, 2021, on the theme - 'The Indian Web of Arts and Aesthetics'. About 13 eminent scholars, practitioners and cultural proponents from India and overseas, including the course coordinators Prof Michel Danino and Ms Mana Shah from IITGN, explored the processes of Indian arts and aesthetics.

Nearly 30 courses offered at the institute in 2020-21, related to SDG 11:

CE 202: Sustainability and environment
CE 306: Civil Engineering Materials Lab
CE 307: Masonry Design
CE 403: Construction Technology and Management
CE 605: Remote Sensing of Land and Water Resources
CE 615: Structural Design for Fire
CE 629: Geosynthetics
CE 633: Water Resource Systems: Planning and Management
CE 692-I: Special Topics in Civil Engineering: Risk based seismic evaluation of existing buildings
EE 426: Electric Vehicle Technology
EH 605: Modelling of Earth System and Sustainability
EH 610: Engineering Seismology and Seismic Hazard Analysis
ES 635: Water Quality Engineering
HS 104 (R): Foundational Sanskrit
HS 111: Urdu script and poetry
HS 112: Urdu poetry interpretation
HS 201: World Civilisations and Cultures
HS 211 (N): Exploring India's cultural, scientific and technological heritage
HS 223: Sanskrit Literature
HS 326: Harappan Civilisation
HS 391: Special Topics in HSS: Music Traditions of India
HS 425: Introduction to Archaeology
HS 491-III: Special Topics in HSS: Storytelling for the Digital Era
HS 508: Introduction to Indian Knowledge Systems
HS 510: Perspectives on Indian Civilisation
HS 519: Linguistic Anthropology
HS 642: Structures and Hydrology in Ancient India
IN 304: Ancient Indian Technology
IN 402: Human Evolution
SC 264: Active Tectonics & Earthquake Geology: A tool for Seismic Hazard Assessment

The Humanities and Social Sciences discipline at the institute offers several courses for learning languages such as French, Sanskrit, Chinese, Urdu, Japanese, and Gujarati, and the students are encouraged to take these courses. Moreover, the institute has established four endowed chairs in Sanskrit, Urdu, Classical Indian Music and Indian Performing Arts to promote Indian cultural traditions in its curriculum.

Community Outreach

The Cultural Council of IITGN organised a series of online activities for the community, including Radio Rangmanch, Aalap - singing competition, a Comic Strip competition, Incredible - culinary competition, and a theme based photography competition. Each of these events saw a good turnout of participants from students, faculty and staff.

The Cultural Council at IITGN and the Spic Macay IITGN chapter organised Kala Samanvay, a series of live online cultural events during September 12-14, 2020. Renowned artists and Padma Shri recipients Geeta Chandran performed BharatanatyamPrahlad Tipaniya presented Kabeer Sangeet, on September 12 and 13, respectively. Besides, an acclaimed Japanese movie, Kumonosu-jō (Throne of Blood) by Akira Kurosawa, was screened and discussed on September 14.

The Staff Development Cell (SDC) organised the fourth edition of ‘Strides’ on October 31, 2020. The theme for this year’s virtual cultural event was ‘Unrelenting Steps’. The IITGN community, including staff, faculty, and their families, participated and showcased their talents in dance, singing, poetry recitation and quiz.

IITGN organised a webinar series titled ‘Storytelling, Transmediality, and the Aesthetics of Visuality’ from November 3-9, 2020, under the aegis of Continuing Education Programme (CEP). The week-long virtual event included immersive lectures, talks, critical/creative insights and lec-dems on the wonders of storytelling across different mediums.

A short course, Communicative English for Staff (Advance) was offered by Ms Akanksha Tripathi, former Teaching Associate, Writing Studio, IITGN, in the span of four weeks in the month of January 2021. Another short course on ‘Spoken Word Poetry: From Page to Stage’ was undertaken by Mr Nivid Desai, a writer, translator, editor, public speaker and research scholar on March 16, 18, 20, 22, and 24, 2021.

Homi’s Young Scholars’ Conference: As part of the ‘History of Mathematics in India (HoMI)’ project, the Institute conducted a two-day online Young Scholars’ Conference on History of Mathematics, with a special focus on India, on April 17-18, 2021.

Seminar series on Indian scientists: IITGN hosted the third edition of ‘Seminar Series on Indian Scientists’ in online mode on April 17, 2021.

The Quizzing Society organised a quiz competition and a poster presentation competition on the occasion of World Earth Day on April 22, 2021, and also conducted ‘MELAS Quiz’ on June 6, 2021. The third edition of Rangmanch was organised on April 25, 2021, with musical and poetry performances by students. The Cultural Council organised ‘Valo League’, a multiplayer online gaming event, from May 22 to June 13, 2021. The Palette Club organised ‘ReCreate It!’, an art competition to recreate popular artwork, from May 16-23, 2021. The Literary Society organised ‘Queerentine’, a literature and art competition to celebrate international pride month, from June 1-15, 2021.

Operations

To further enhance the campus experience, add to its beauty, and encourage academic development, IITGN has embarked upon an ambitious “Art on Campus” project, which focuses on art installations around the campus. The Institute has engaged an external consultant to develop a dynamic long-term master plan for this project that is aimed at establishing a connection between buildings, social settings and their surrounding environments.

The Institute has established fellowships to encourage students to explore the rich cultural and rural heritage of India. Explorer Fellowship at IITGN is a unique annual summer programme which allows its students to discover India's cultural diversity by exploring the length and breadth of the country on a very limited budget. Gram Fellowship is an initiative by the institute that provides students with an opportunity to spend three to six weeks to experience the nuanced rural/peri-urban life in various parts of India and understand its problems. The students may also take up a project to address the issues through product/service or any other solutions. The projects are funded by the institute, up to INR 25,000.

The university as a body provides public access to the library. There are no charges for using the library and on-site. However, there are nominal charges for lending books and delivering articles to external (academic institutions and individual - researchers and academicians) members.

The institute has been designed to be pedestrian and cycle-friendly and offers public transportation community members both on campus and outside (covering areas up to a distance of approximately 20 km toward the nearest city of Gandhinagar). IITGN has a residential campus with approximately 65% of its employees (including faculty and staff) staying inside the campus. Hence, it reduces the need for a longer commute and gives flexibility to the employees for work. The institute provides state-of-the-art residential facilities to all its students at an affordable fee. No student is denied hostel accommodation on account of non-availability.

The master plan had accounted for "environment and energy response" as one of its major components. It attempted to make the campus an exemplary project for sustainable development and the buildings were built to Green Rating for Integrated Habitat Assessment (GRIHA) and Energy Conservation Building Code (ECBC) standards. The master plan complied with the National Building Code 2009 of India, including the 'Approach to Sustainability'. The guiding principles included the following: a) complete and absolute respect for the environment at both micro and macro levels, and b) respect, conserve and, wherever possible, recycle resources. IITGN became the first campus in India to be awarded a five-star rating by Green Rating for Integrated Habitat Assessment for Large Developments (GRIHA LD) in 2016.