



# SDG 9: INDUSTRY, INNOVATION AND INFRASTRUCTURE

## BUILD RESILIENT INFRASTRUCTURE, PROMOTE INCLUSIVE AND SUSTAINABLE INDUSTRIALISATION AND FOSTER INNOVATION

The Indian Institute of Technology, Gandhinagar (IITGN) strives to promote innovation in research and practice through various measures such as state-of-the-art central instrumentation facility, which provides lab infrastructure including instruments to facilitate multidisciplinary research and caters to the needs of academic research institutes, universities, and industries for high-end material characterisation. It also endeavours to provide training to a range of stakeholders, including industry professionals, engineers and government officials and collaborate with regional, national and global organisations. “To create a vibrant atmosphere that breeds front runner innovators, scientists, engineers, entrepreneurs, academicians and thinkers of tomorrow” is one of the key visions of the institute.

### Research

The institute conducts industry-oriented research such as sustainable industrial chemicals, efficient chemical

reactors and biotech research (bioethics, responsible research innovation, etc.), among others. The institute has taken several efforts to connect research to industry requirements and adequate infrastructure is provided for the researchers to undertake studies in various areas. The institute has a research park that bridges the industry and academia while the IITGN Innovation and Entrepreneurship Centre (IIEC) provides support and training to startups for converting their ideas into viable and scalable businesses.

### **Research Park**

IITGN Research Park seeks to foster a powerful interplay between the industry and the academia, thereby pushing the boundaries of innovation and research. Industries can set up their offices at the research park and carry out research and development (R&D) activities. This allows them to be part of a vibrant community and gain access to R&D professionals, IITGN students and state-of-the-art infrastructure. The park facilitates collaborations between industries and IITGN faculty members. It also enables industry partners to access laboratories, high-end equipment and other resources at IITGN. The research park provides advice on collaborative R&D, enables interactions between industry members of the Research Park as well as industries and academia within the geographical region, IP management and licensing, etc.



Many national and international industry veterans are currently operating their R&D units from IITGN Research Park, including NASSCOM, elfnochips, WIN Foundation, BBC, CPWD and GUVNL.

### ***IITGN Innovation and Entrepreneurship Centre***

IITGN Innovation and Entrepreneurship Centre (IIEC) is a technology business incubator (TBI) located within IITGN. It is a Section 8 company promoted with the mission of fostering techno-entrepreneurship through innovative and creative thinking using an interdisciplinary approach. As part of one of the leading technology institutions in the country, it brings unique value by allowing portfolio companies access to IITGN's infrastructure (labs, know-how, technical experts and more) and providing closer attention and assistance.

IIEC helps in mitigating technology risks, recognising and addressing the challenges in a development process to make your startup stand apart. It provides the right ecosystem and support to bring the technology to market for commercial success and to create a social impact through a pool of mentors and advisors that help startups convert ideas into viable and scalable businesses. IIEC is committed to bring technical knowledge and strong corporate network along with the support of our shareholders complimenting a strong ecosystem for nurturing start-ups.

### ***Research projects***

Various research projects that demonstrate innovation in sustainability-related subjects are supported and funded

by the institute through its internal grants as well as by the Kiran Patel Centre for Sustainable Development. External research funds from industry partners helps in fostering a collaborative innovation and tackling some of the bigger societal challenges.

### ***Global collaborations with SPARC projects***

The Ministry of Human Resource Development (MHRD), Government of India, has approved 13 IITGN international research projects worth INR 7.93 crore as part of the 'Scheme for Promotion of Academic and Research Collaboration (SPARC)'. Increasing its global footprint, the institute will collaborate with faculty and researchers in 10 international institutions across seven countries, namely France, USA, New Zealand, South Africa, Israel, Canada and Australia. These research projects bring together IITGN faculty and world-class scholars to work on fundamental, action-oriented and innovation-driven research in emerging areas of impact.

### ***Central Instrumentation Facility***

The Central Instrumentation Facility (CIF) has been established with the objective of providing sophisticated characterisation services to the researchers both within and outside the institute. CIF houses several high-end state-of-the-art instruments and aims to provide a central facility consisting of the latest and advanced analytical instruments to facilitate multidisciplinary research and cater to the needs of academic research institutes, universities and industries for high-end material characterisation.

The institute recently inaugurated a Transmission Electron Microscopy (TEM) facility on its campus. Installed at a total cost of INR 12 crore, this facility is one of its kind in the entire state of Gujarat and is one of the few such microscopes in the country.

Transmission Electron Microscope uses high energy electron beams to secure material images with very high magnification. With advanced electromagnetic lenses, it can magnify objects up to 1 million times of its actual size. These images can offer detailed information about the size, shape and morphological details of the materials. Inauguration of this ultramodern TEM facility has opened a new scope of modern research opportunities for the faculty members, research scholars and students both in and outside of IITGN.

### ***Innovation labs***

IITGN has unique centres and facilities that promote innovation in research and practice. Examples include the Design and Innovation Centre, Centre for Creative Learning and Tinkerer's Lab.

The Design and Innovation Centre (DIC) promotes collaborative research and educational initiatives on design and innovation. The discipline of design encourages students to develop innovative products and services through curricular and extra-curricular projects. The centre fosters a multidisciplinary approach and supports projects of innovative nature. It collaborates with globally acclaimed institutions on projects with strong industry and social focus and follows a human-centric design philosophy. DIC projects range from social innovations and ecological design to frugal engineering.

The Centre for Creative Learning (CCL) came into being in April 2017 as a space that nurtures a scientific temper and the inherent creativity in students and teachers alike. The idea was, and remains, to immerse oneself in a subject in order to learn it and to do more than to read. CCL strives to make classes engaging and provide experiential learning to foster creativity and innovation. It boasts of 1000+ unique STEM models and activities, including 100+ STEM and hands-on learning workshops for over 10,000 teachers and engineering college professors, and interaction with 100,000 students from across the country.

IITGN, a relatively new institute with the aim to foster creativity among young engineers, researchers, innovators, and entrepreneurs, in its endeavor to embed learning-by-doing in the academic curriculum established Tinkerers' Lab (TL) at its newly built campus in January 2018 with the support from IIT Bombay Alumni of 1975 batch. TL is a 24x7 technical facility with essential mechanical, electrical, and electronics tools and equipment to build and program things, accessible by the entire IITGN community. It provides a workspace where students work on various

course-related and/or independent projects hands-on. The TL at IITGN is completely a students' initiative that requires our students to execute day-to-day operational and maintenance tasks. TL encourages the community members to learn new skills through workshops and competitions, and aims to set up a culture where students are not afraid to get their hands dirty. Not only this, it enables students to gain self-dependence and efficiency in experimentation, and promotes a culture where they can approach problems theoretically as well as practically. Using knowledge and experience gained in the process, the students are thereby supported in coming up with something exceptional that could change the course of future.

### ***Intellectual Property team***

The incubation centre connects entrepreneurs with mentors who can help develop and scale up their technology or products and identify their market for legal and intellectual property-related guidance apart from helping the incubates financially.

## **Operations**

### ***Vikram Sarabhai Chair***

Gujarat Council on Science and Technology (GUJCOST) has established a Vikram Sarabhai Chair at IITGN to promote interdisciplinary research and innovation in emerging areas of science and technology. The Chair encourages and supports various academic and research activities.

### ***MSME grants***

IIEC has been recognised as a host institute to implement the entrepreneurship support programme by the Ministry of Micro, Small and Medium Enterprises (MSME), Govt. of India. As per the programme, a startup recommended by the host institute can get grant funding of up to INR15 lakh.

### ***Industry-academia associateship***

IITGN wishes to augment avenues for institute-academia interaction to facilitate collaborative research, development, and innovation activities through an Industry-Academic Associateship Scheme. Engineers, managers or experienced professionals from reputed industries are invited to engage in full-time interaction with faculty and students at IITGN. During their tenure, the associates interact with faculty members working in associated/overlapping areas of interest, identify and facilitate pursuit of projects/internships for students, deliver special lectures in areas of their expertise, identify areas/projects for collaborative pursuits, and contribute to curriculum development, laboratory upgradation and related activities.

## Education

IITGN has launched an Alumni Residency Programme with the aim of engaging alumni in creating a vibrant and enriching ecosystem at the institute. IITGN alumni with a minimum three years of experience after graduation, can stay on campus and engage with the students and faculty for a range of activities/ initiatives.

The Staff Development Cell (SDC) of the institute organised 'Leaps and Bounds' Outbound Training (OBT) 3.0 on 7 December, 2019 at a campsite in Anand, Gujarat. Several unique team-building and adventurous activities were organised for the non-teaching staff in which around 70 staff members participated.

The institute is planning to introduce a Minor in Sustainable Development that would focus on various sustainability-related opportunities and challenges. It is planned as an interdisciplinary programme that will include subjects from various fields such as water, climate change, pollution, energy and natural resources.

FP 100: Foundation Programme

ME 332: Industrial Engineering and Operations Research

MS 403: Engineering Entrepreneurship

MS 406: Business Skills for Entrepreneurs

MS 411: New Technology Applications, Design and Business Models (NTADB M)

MSE 621: Process Plant Design – How to Set Up a Process Industry

A short course on *Building Early-stage Startups and Valuations* by B V Jagadeesh, KAAJ Ventures was offered during 20-25 January 2020.

## Community outreach

### Summer Entrepreneurship Programme

IIEC conducted a two-month Summer Entrepreneurship Programme starting 14 May, 2019 during which students and entrepreneurs from various institutions and organisations worked on validating their ideas, and learnt about entrepreneurship in a structured manner. They were provided with access to the Tinkerer's Lab, co-working space, faculty members, and the labs of IITGN for making a prototype. A total of 32 participants attended the programme.

### Boeing Build Programme

IIEC partnered with Boeing India to implement BUILD (Boeing's University Innovation Leadership Development) programme, a five-day bootcamp for students and early-stage startups during 2-6 August, 2019. Twelve (12) student teams and early-stage startups from Gujarat, Madhya Pradesh and Rajasthan were exposed to different aspects of a startup such as design thinking, defining value

proposition, business model canvas, startup lifecycle, and entrepreneurial finance. The programme ended with a regional pitching competition held on 7 August, 2019.

### Interaction with startups

Shri Ravi Shankar Prasad, former Union Minister for Law and Justice, Communications, and Electronics and IT, inaugurated the NASSCOM Centre of Excellence - IoT & AI at IITGN Research Park on 11 September, 2019. He also interacted with the startups and IT industry leaders from Gujarat. Kamallesh Dwivedi, Business Partner, 3Lines Venture Capital, visited IITGN as a Mentor-in-Residence for the startups and the students during 3-13 January 2020. Atul Jain, Founder & CEO, TEOCO visited IITGN and interacted with faculty, student leadership team, and startup owners on 29 January 2020.

### Research Connect Forum

IITGN and Elsevier jointly organised a Research Connect Forum on the theme 'Research Collaboration and its Impact on Innovation and Economic Development' on 17 October, 2019. More than 75 eminent academicians, industry representatives, and research administrators from across the state and the South-Asia region attended the event. The forum discussed topics such as evolving expectations for universities, research collaboration, artificial intelligence in research and innovation, importance of research data in economic development and university rankings, strategies and practices to build a world-class research university, industry-academic collaboration, and IPR in research and innovation, among others.

### Connections 2019

The second edition of the industry conclave – Connections 2019: Creating Opportunity to Stimulate Industry-Academia Partnerships – was held on 9 November, 2019. The event saw participation from more than 50 industries from a wide range of sectors viz. auto, chemicals, construction, IT and data science, materials, pharma, engineering, and so on. Some of the leading companies included Zydus, Tata Motors, Tata Chemicals, HILTI, Honeywell, Aditya Birla, Forbes Marshall, Optimized Solutions and ITC, among others.

The event, designed to enable and enhance communication between industry leaders, IITGN faculty and students to establish long-term collaboration and partnerships, comprised several interactive sessions and activities that helped provide the industry leaders an overview of the IITGN infrastructure and collaboration opportunities for industry-academia at IITGN Research Park.



Idea pitching and networking session for startups  
A two-day pitching session was organised for 37 startups during 9-10 December 2019. The session was organised in collaboration with Denver, US-based venture capital firm 3Lines Venture Capital. The screening team comprised Kamallesh Dwivedi, Krishna Kunapulli and Ashish Jain. Ten (10) companies were shortlisted for further due diligence for investments; one of the teams - Lymbedge - was adjudged 3Lines India Best Innovation and was awarded a cash prize of INR 51,000.

The startup pitching and networking programme was organised as part of Connections 2019 on 9 November, 2019. Out of the 75 startups who applied for pitching, eight got the opportunity to pitch their ideas.

### ***IGRIP Conclave***

To mark the one-year anniversary of Initiative for Geotechnical Research and Innovative Practices (iGrip), a two-day conclave was organised at IITGN by Prof Ajanta Sachan during 2-3 March, 2020. The conclave brought together various stakeholders involved in geotechnical engineering and related areas. About 55 industry professionals, government officials, faculty members and students from all over the country were made aware about innovative practices thereby fostering multidisciplinary research through the amalgamation of academia and industry.

### ***Advisory Council of IIEC and Research Park***

The fourth meeting of the Advisory Council for IIEC and IITGN Research Park took place on 5 March, 2020.

Illustrious members who participated included Kris Gopalakrishnan, Ajai Chowdhry, Soumya Rajan, R Gopalakrishnan, Vijaya K Ivaturi, Sajnay Randhar, Anand Parekh, and Kunal Upadhyay.

### ***iDE 2.0***

With the commitment to develop a culture of innovation and entrepreneurial spirit among students, IIEC and the Entrepreneurship Initiative of IITGN (EII) conducted iDE 2.0. About 27 teams came up with innovative ideas and presented it to a panel who recommended action plans to help refine their ideas.

Five shortlisted student teams under the initiative Innovation Driven Entrepreneurship (iDE) 2.0 attended a bootcamp at Bengaluru during 9-14 March, 2020. They visited R&D centres of different companies and incubators, and interacted with leading entrepreneurs.

### ***Entrepreneurial Mindset 101***

IIEC conducted Entrepreneurial Mindset 101, an online mentorship programme for students interested in entrepreneurship between 30 April and 2 June, 2020 to equip students with the fundamentals of a startup. Twenty three (23) BTech, MTech, MA, MSc and PhD students completed the programme delivered by RA Venkitachalam. The students also had the opportunity to interact with a cross-section of entrepreneurs, including some of the startups by IITGN alumni.

Creating a marketplace to help businesses and students outsource their prototyping requirements, a device to

detect car accidents and alert the emergency services, and a platform to connect labourers in the unorganised sector to those who need their services were among the top startup ideas generated during this month-long e-mentorship programme.

### ***Establishment of Nidhi Prayas Centre***

The Department of Science & Technology, Government of India has sanctioned a grant of INR 60 lakh for the establishment of a Prayas Centre at IIEC under their Nidhi Prayas programme for the year

2020-21. The Ministry of MSME, Government of India has also recognised IIEC as a host institute to implement its entrepreneurship support programme.

### ***Support to startups***

Twelve (12) startups, companies including Geo-carte Radar Technology, MICOB, Whitepanda, Powency Circuit, Auto-Forest, Svakatha, InfyU Labs, Snapper, etc. were supported under the incubation and pre-incubation programme at IIEC during the year 2019-20.

