



SDG 4: Quality Education

ENSURE INCLUSIVE AND EQUITABLE QUALITY EDUCATION AND PROMOTE LIFELONG LEARNING OPPORTUNITIES FOR ALL

IIT Gandhinagar is committed to a holistic approach to education in engineering disciplines and beyond; cutting-edge research addressing global challenges; and giving back. IIT Gandhinagar offers a unique undergraduate and graduate education experience in India with unmatched innovations in curriculum. We take pride in our student-centric philosophy resulting in a safe, nurturing, and empowering environment for students. The institute promotes critical thinking and an appreciation of the interdisciplinary character of knowledge, with an emphasis on the liberal arts, project-oriented learning, compulsory courses in design and the life sciences, diversity and globalisation.

Research

Our researchers include faculty members, visiting scholars, post-doctoral fellows, graduate, and undergraduate students. They collaborate with colleagues across the institute, affiliated institutions, and other research institutions. We aim to bring IITGN as an institution for higher learning in science, technology, and Humanities that aspires to develop top-notch scientists, engineers, leaders, and entrepreneurs to meet the needs of society. All the research projects undergoing contribute practical and application-based knowledge to working students and researchers. However, there are few research projects which directly focus on SDG4. The research projects along with the names of the funding agencies are as follows:

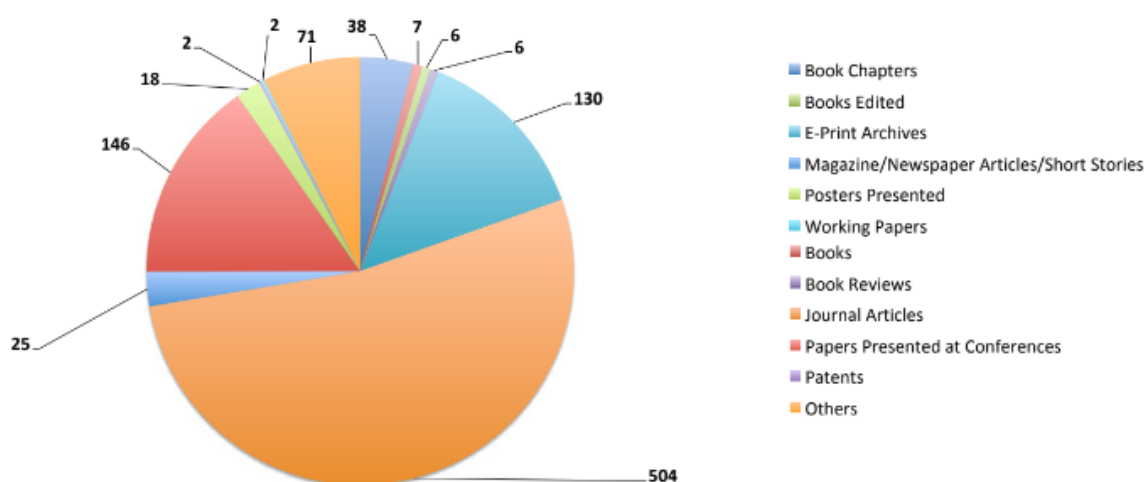
- Curiosity to aid learning and motivation in Schools; Indian Council of Social Science Research
- Developing Physics guided super-resolution approach and evaluation strategies for down-scaling earth system model output; SERB

Along with these, an article has been published in a reputed journal, involving three researchers of IITGN contributing as authors regarding this SDG.

However, the institute as a whole has contributed in various fields by publishing its research work. The details of this can be found in the following figure and table-

Document Type	No of Research Publications
Book Chapters	38
Books	7
Books Edited	6
Book Reviews	6
E-Print Archives	130
Journal Articles	504
Magazine/Newspaper Articles/Short Stories	25

Document Type	No of Research Publications
Papers Presented at Conferences	146
Posters Presented	18
Patents	2
Working Papers	2
Others	71
Total	955



Education

592 courses including the electives, special courses, optional and regular were offered in the institute during the assessment period. This ranges from sciences, engineering, social sciences, language, economics etc. The Humanities and Social Sciences discipline of the institute offers several courses for learning languages such as French, Sanskrit, Chinese, Urdu, Japanese, and Gujarati. IITGN 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.

To give students an enhanced education experience- the institute, besides its regular courses organises a lot many events such as- workshop, talks, seminar, short courses etc. This helps students in enhancing their technical skills, personal skills, writing skills, and gives broader ideas of various fields. Following are the events conducted during the assessment period-

Online workshops, lecture series and invited talks

- Inspiring Research & Innovation Using IEEE Publications (IEEEEXplore) by Dr Dhanukumar Pattanashetti, Senior Client Services Manager at IEEE, January 25, 2021.
- Advance Your Research Using SciFinder-n by Mr Rohan Kohok, Customer success specialist, ACSI India (Chemical Abstract Services, USA), January 27, 2021.
- Basics of Writing and Getting Published A Quality Technical Paper by Dr Dhanukumar Pattanashetti, Senior Client Services Manager at IEEE, February 23, 2021.
- Integrating Scopus in Research Workflow by Dr Shubhra Dutta, Customer Consultant (Core Content) - South Asia A&G Team, ELSEVIER Publisher, February 25, 2021.
- Basic 3D Modelling Using Rhinoceros by Mr Singhara Kannappan, Product Designer, Design and Innovation Centre (DIC), IITGN, March 8, 10, 12, 2021.
- The Japan Advanced Institute of Science and Technology (JAIST) and IITGN jointly organised an online international workshop on 'Education under the Pandemic and Post-pandemic Era' during March 8-9, 2021.
- Demystifying the PhD: Managing Expectations and Reality by Prof Himanshu Shekhar, Assistant Professor, Electrical Engineering, IITGN, March 13 & 14, 2021.
- Think. Design. Cut. - Laser Cutting Workshop by Mr Tanvir Khorajiya, Maker Bhavan, IITGN, March 17-19, 2021.
- Integrating MENDELEY - Reference Management Software in Your Research Workflow by Dr Shubhra Dutta, Customer Consultant (Core Content) - South Asia A&G Team, ELSEVIER Publisher, March 18, 2021.

Filming and Audio Production workshop for IITGN staff members by Mr Devarsh Barbhaya, Communication Assistant, External Communications, IITGN, September 30 - October 1, 2020.

Short courses

The Institute conducted short courses under TEQIP-III titled as - 1) 'Data Science & Analytics'; 2) 'Frontiers in the Energy-Water Nexus'; 3) 'Design of CMOS Operational Amplifier ICs- A unique pedagogical approach'; and 4) 'Role of Power Electronics in Power Engineering'. About 100 engineering faculty of the country participated in these courses.

- EQAL- Emotional Quotient for Authentic Leadership by Ms Rashmi Datt, an Organisation Development Consultant and Coach, October 3, 2020.

- Future Faculty: A Life of a Scientist behind the Shadow of Science by Prof Hardik Pandya, Assistant Professor, Department of Electronic Systems Engineering, IISc Bangalore, October 25, 2020.

Workplace Leadership for Millennial by Prof Rajeev Sharma, Professor at International Management Institute (IMI), New Delhi, October 24 to November 29, 2020.

- Chemical Processes by Dr Subhash Deodhar, Senior Consultant, Fisher International, USA, October 26 to December 4, 2020.

- Balancing Research and Teaching at a Teaching Intensive Institution by Dr Mayuri Rege, DST-INSPIRE Faculty, Department of Microbiology, Ramnarain Ruia Autonomous College, Mumbai, November 7, 2020.

- Instrumentation and Control for Technical Staff by Prof S Rajendran, Prof Gopinadhan Kalon, and Mr Pragnesh Parekh, December 14-24, 2020.

- Communicative English for Staff (Advance) by Ms Akanksha Tripathi, former Teaching Associate, Writing Studio, IITGN, in the span of four weeks in the month of January 2021.

- Governance Structure in India by Mr Jagdish Prasad Gupta, an Indian Administrative Services (IAS) Officer of 1991 batch of Gujarat Cadre, every week on Saturday during January 23 to March 6, 2021.
- Spoken Word Poetry - From Page to Stage by Mr Nivid Desai, a writer, translator, editor, public speaker and research scholar, March 16, 18, 20, 22, and 24, 2021.
- Nature-Inspired Design, Mr Sanjay Jain, Professor, SAGE Institute of Design, 2 hours/ week during March 20 to April 24, 2021.

Miscellaneous

- 31ST IAGRG meeting: The discipline of Physics organised the 31st meeting of Indian Association for General Relativity and Gravitation (IAGRG) as a web conference on December 19-20, 2020. The broad theme of the web conference was - ‘Quasinormal Modes from Black Holes’. National and international scholars and subject experts were invited as speakers during the conference.
- IITGN started the 5th edition of its unique elective course, Introduction to Indian Knowledge Systems (IKS), online from January 13, 2021, on the theme - ‘The Indian Web of Arts and Aesthetics’.
- The Centre for Cognitive and Brain Sciences celebrated Brain Awareness Week from March 15 to 21, 2021. The virtual event included a variety of talks, panel discussions, workshops, and competitions by the scholars and practitioners of cognitive and brain sciences from India and abroad.
- Seminar series on Indian scientist: IITGN hosted the third edition of ‘Seminar Series on Indian Scientists’ in online mode on April 17, 2021.
- Theoretical Physics School: The discipline of Physics organised a virtual ‘Theoretical Physics School’ during June 7-11, 2021.
- Course on topology and Differential Geometry: The discipline of Physics organised an online course on ‘Topology and Differential Geometry for Physicists’ by Prof Sunil Mukhi, Professor, IISER Pune.

Community Outreach

IITGN has signed Memorandum of Understandings with NIT Sikkim (NITS) and NIT Hamirpur (NITH) to facilitate student exchange, academic cooperation, and research collaboration among faculty members of both the institutes.

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.

National Symposium in Radiation and Photochemistry: The discipline of Chemistry, with support of the Indian Society of Radiation and Photochemical Sciences, hosted 14th Biennial National Symposium in Radiation and Photochemistry on June 25 & 26, 2021.

Chemcatcon 1.0: The discipline of Chemistry virtually organised ChemCatCon 1.0 during July 11-12, 2020. The conference offered a platform for young researchers to acquire knowledge in the area of heterogeneous catalysis, which is considered as the central science for a sustainable future.

Indian Symposium on Machine Learning: IITGN and IIT Kharagpur jointly organised the first Indian Symposium on Machine Learning (IndoML) on the theme “AI for Science and Science for AI” during December 16-18, 2020. More than 20 experts from all over the world discussed state-of-the-art Machine

Learning research and related topics during the event. Around 3000 participants registered for the virtual event from across the globe.

Operations

To serve as one of the best institutes for higher education is the primary goal of the IITGN. All our activities are planned as per this vision. Besides a well-serving curriculum running for different programmes. Many other supporting and completing activities for providing quality education are carried out on the campus. Some of them are listed below:

Student leadership Conclave and leadership-related activities

- The fourth edition of the Student Leadership Conclave was organised by IITGN students in a virtual mode on January 9-10, 2021. Students from all 23 IITs participated in the two-day conclave to discuss various emerging issues at IITs.
- O-CEO Programme intends to build real job skills and leadership skills among students and also help them sustain themselves while studying. The Institute has launched a new initiative called 'On-Campus Employment Opportunities' (O-CEO) programme for eligible BTech and Master (MSc, MA and MTech) students.

IGNITE 7.0

Ignite - the annual intra-college technical fest of IITGN - returned with its seventh edition this year during March 13-29, 2021. Ignite 7.0 brought a gamut of exciting online and offline events and activities, which provided students with a platform to highlight their technical skills.

Research facilities

Research at IITGN covers a wide spectrum and is inspired by both real-world challenges and issues of fundamental importance. Further, our interdisciplinary centres of excellence, cross-institutional agreements, and vibrant visiting faculty program enrich our research and allow us to address ambitious issues that require inherently interdisciplinary approaches. The institute has state-of-the-art laboratories and research facilities with the latest equipment and infrastructure.

Library facilities

The library has a fast-growing collection of books, journals, and magazines both in print and digital format covering most disciplines taught and researched at the institute. To support the research activities, the library subscribes to a core collection (over 70+) e-journals, e-databases, e-books, and others. Library services have been fully automated and are accessible on and off-campus.

Covid-19 and our adaptation

- Because of the lockdown and interruption in offline classes we in the 2020 summer vacation instead of resuming the disrupted semester immediately in online mode gave us time. This gave all faculty members time to prepare themselves to teach online.
- Few selected faculty members taught courses online in the summer and the entire faculty body benefited from their collective experiences. These faculty members tried different techniques, used different platforms and learnt their inherent features and limitations.
- The institute then organised workshops on online teaching in which these faculty members shared their experiences. All the necessary support and equipment were provided, and this enabled the faculty members to adapt quickly and teach online effectively.
- We switched to the online mode of teaching and learning from June 8, 2020, and introduced a new grading system for the disrupted academic term, under which no letter grades were awarded

in the second semester of the academic year 2019-20 for any course. Instead, two new grades were introduced - 'P(E)' (Pass Emergency) and 'I/F' (Incomplete/Fail) for all the courses of the semester. In addition, all students who get an 'I/F' grade were also given one more opportunity to complete the course requirement and improve their performance to earn a 'P(E)' grade. This revised grading policy was designed to reflect continuous learning, ensure fairness and reflect the disruptive impact of the pandemic on the educational system.

- The pandemic delayed the joining of the new batch of BTech students to mid-November. For these students, our flagship Foundation Programme was re-designed for virtual mode. We also reconfigured the first-year curriculum for this batch and split the year into three terms: 6 weeks, 15 weeks, and 8 weeks, respectively. The first term of six weeks included a course on Computing, Writing, and Learning to learn. With this timeline, the academic schedule of all the students was synchronised from January 2021.
- We also launched several initiatives to help the graduating students whose future plans may have been interrupted by the COVID-19 pandemic. The Institute launched a one-year Postgraduate Diploma Program (PGDIIT) for the Academic Year (2020-21) for students of the graduating class. This Postgraduate Diploma also aims to help graduating students who are interested in exploring but are not fully committed to a Master's programme. A candidate completing the PGDIIT can subsequently choose to apply to enrol for the MTech degree.
- Academic relief to students: The second wave of the pandemic posed a number of challenges for the students in Semester II 2020-21, as the pandemic affected them and their families in different ways. Considering the extraordinary and challenging circumstances and their possible impact on the academic performance of students, the Senate approved several measures to provide relief to the students for Semester II 2020-21, including provision for multiple make-up examinations, an opportunity for reassessment to students who receive E/F grade, option to drop project courses, among others.

Miscellaneous

- Momentum in faculty recruitment- The Institute did not let the pandemic disrupt faculty recruitment and quickly shifted to online platforms to connect with the faculty candidates. From July 2020 to June 2021, the Institute made 25 offers, of which 19 accepted the offer. The number of career faculty at the Institute now stands at 110, and 8 others are expected to join in due course. The Institute has also made significant progress in engaging Professors of Practice.
- In addition, IITGN also offered the 'Sabarmati Bridge Fellowship' to enable graduating students to make use of this time to embark on cutting-edge research.
- Innovative curriculum and active learning- Award-winning curriculum, project-based learning, creativity, and entrepreneurship, encouraged an emphasis on design, humanities, and life sciences to promote out-of-the-box and non-linear thinking.
- International exposure- 40% of UG and 77% of PhD students receive international exposure
- Increasing emphasis on learning-by-doing and active learning.
- Tinkerer's Lab for fearless experimentation.
- Programmes such as Invent@IITGN to promote innovations and inventions.
- Maker Bhavan to drive active learning and research innovation.
- Prof Sudhir K Jain, Director, was invited by various organisations and forums to discuss and share his thoughts in the areas of education and institutional management. On April 14, 2021, he

was invited as a panellist to discuss 'Education 4.0: Role of Industry Partnership and Curriculum' in a webinar by BW Education.

- Freedom, flexibility, autonomy and support to try out new pedagogical approaches.
- IITGN has been ranked among the top 800 educational institutes worldwide and 4th in India in the Times Higher Education (THE) World University Rankings 2021.
- IITGN climbed 16 positions to be ranked 35th in the overall category and retained its 24th rank in the engineering category in the India Rankings 2020 by the National Institutional Ranking Framework (NIRF).
- Aarohan 2021: The Institute organised "Aarohan", an orientation programme for new postgraduate students.
- CAMP HSS 2021: IITGN conducted a first-of-its-kind free online event - 'Camp HSS' - for school students of classes 8-12 to help them develop critical thinking, empathy and creativity.
- In yet another academic innovation, the Institute has introduced the Undergraduate Teaching Assistantship (UGTA) programme with a vision to enrich the educational experience of UG students.
- IITGN Innovation and Entrepreneurship Centre (IIEC) organised a total of 20 'Mentor Clinics' for 14 teams of IITGN students to discuss their ideas, provide feedback and connect them to the mentors. Each session spanned for around 1-1.5 hours.
- Work and Study MTech programme: In addition to the existing full-time two-year MTech programme, IITGN is introducing a Work and Study MTech programme to create a specialised workforce for major facilities/laboratories and research projects within the Institute as well as for various research establishments. While MTech graduation requirements will remain unchanged in this programme, enrolled students can complete it at a relatively slower pace while simultaneously working in the Institute.
- Vikram Sarabhai Research Fellowship: IITGN introduced Vikram Sarabhai Research Fellowship that aims to encourage PhD students to complete their PhD early and enable them to have a competitive advantage. PhD students who submit their thesis within four years of joining will be eligible for this 12-month research fellowship. It will enable IITGN doctorates to explore new research areas, extend their PhD work, and publish scholarly articles and books, besides looking for rewarding career opportunities.
- Scientific writing certificate: The programme started in 2019 was continued this year also with a greater push.