

# ANNUAL REPORT

## 2019-20



## CONTENTS

Vice-Chancellor's Message	4
Message from the Dean (Academic)	5
Message from the Dean (Research and Relationships)	6
About TERI SAS	7
TERI SAS Structure	8
Board of Management	9
Academic Council	11
Student and Faculty Strength	13
TERI SAS Programmes	14-24
Convocation 2017	25
Guest Lectures at the TERI SAS	26
List of Publications	27-28
List of Memorandums of Understanding	29
Honorary Doctoral Degrees Awarded	30
Ongoing Doctoral Research	31-38
Honours and Awards	39-40
Student Clubs at TERI SAS	41-42
Events at TERI SAS	43
TERI SAS Library	44-47
IT Infrastructure at TERI SAS	48-52
Green Campus	53-54
TERI SAS Laboratories (Resources)	55-59
School-TERI SAS Network	60-61





## Vice-Chancellor's Message

TERI SAS remains the pioneer and leader in sustainability education and research, not only in India, but also in the globe.

Our aim is to educate generations to enable and equip them to cope with the challenges the world is facing.

Since our inception in 1998, we are committed to higher education, research, innovation and social impact in sustainability studies.

A total of 131 PhDs and roughly 2300 Master's degrees awarded by us is enough to highlight our commitment.

Known for the quality research, the institute has also published more than 600 research publication from 2015 onwards.

Our interdisciplinary doctoral programmes in seven thematic areas cater to the research quest of our students. The 14 Masters programmes cover a wide range of sustainability studies.

Our alumni hold coveted positions at corporates think tanks, government organisations, research institutes, NGOs and international organizations.

The regular alumni meets help us strengthen our bond with our alumnus. We have recently started a Mumbai chapter in February.

We are also coming up with a campus in Hyderabad. We are sure that we will be able to take the new campus to greater heights much like our New Delhi campus.

We are committed to the cause! There's no doubt TERISAS flag would fly higher and higher in the days to come!



### **Message from the Dean (Academics)**

TERI School of Advanced Studies (TERI SAS) has demonstrated its commitment to academic excellence by imparting learning in the areas of Natural resources management, Energy and environment, Economics, Policy studies, Management, Biotechnology, Legal studies and sustainability. Globally recognised for its academic rigor, TERI SAS has contributed to the discourses on sustainability issues at national and global level.

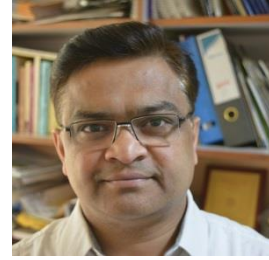
As the Dean (Academic) of TERI SAS, I feel honored to be a part of this future defining legacy. During the year, the Institute made several achievements on the academic front. TERI SAS has relentlessly worked towards strengthening its academic processes. The Institute has taken concrete measures to update its academic curriculum by incorporating and integrating practical aspects of in its curriculum with the aim to foster student employability by industry.

Our initiatives to continue the academic session in the face of the unprecedented situation of lockdown owing to COVID-19 pandemic deserve special mention. TERI SAS recognised the need for extending all possible support to its students during this time. There was a seamless transition from face-to-face classes to online mode with the Institute taking several digital learning initiatives to ensure that teaching is not hampered in any which way. Our staff including administration, IT team and faculty deserves every bit of credit for their effort.

During these challenging times, the Institute also continuously engaged with its students and institutionalized a programme for providing individual mentorship to students through Mentor-Mentee framework which was aimed at promoting a spirited approach for learning and wellbeing of students during the lockdown period. A system of counselling was instituted by TERI SAS was for ensuring mental and emotional wellbeing of its students, faculty, and administration during the lockdown period.

Another achievement that deserves a mention is the way we organized our 12th Convocation that held on 14th Nov 2019. Despite the event having the traditional pomp and glory, we managed to reduce the overall cost by a good 20%. A total of 19 Doctoral and 229 Masters degrees were awarded during the year.

Finally, all I want to say is that I am proud of being a part of TERI SAS. May the great work continue.



### **Message from the Dean (Research and Relationships)**

The TERI School of Advanced Studies has been examining the complex dimensions of sustainable development through research since its inception. The School's endeavour for knowledge creation and capacity enhancement of people and institutions through advance research and engagement, aims to accelerate the transition to a more sustainable world.

Our students and faculty members actively engage into new discourses relating to sustainability challenges and solutions. The unique credentials of the School are defined through an interdisciplinary approach that provides an open and dynamic ecosystem for advance research. The School draws inspiration from the rich cultural heritage and ethos of India while actively reaching out to draw knowledge from across the globe in order to meet expectations of a transforming research and academic landscape.

The School demonstrates its research excellence through domains such as natural resources, energy and environment, biotechnology, water studies, policy studies, business and sustainability and legal studies. The scholarly outputs from our faculty led research, funded through multilateral and bilateral organisations, government and private sector, are testimony of quality and impact. Such multidisciplinary research also complements our student's classroom based learning. The intellectual rigour and values in our students are steered by our dedicated faculty members who employ the research-informed pedagogy for student-centred teaching, learning and assessment.

As the Dean (Research and Relationships) of the TERI School of Advanced Studies, I'm extremely proud of and highly value our partnerships with leading organisations that strengthen our competitive advantage and help us in realising a shared vision of knowledge for sustainable development.

## ABOUT TERI SAS

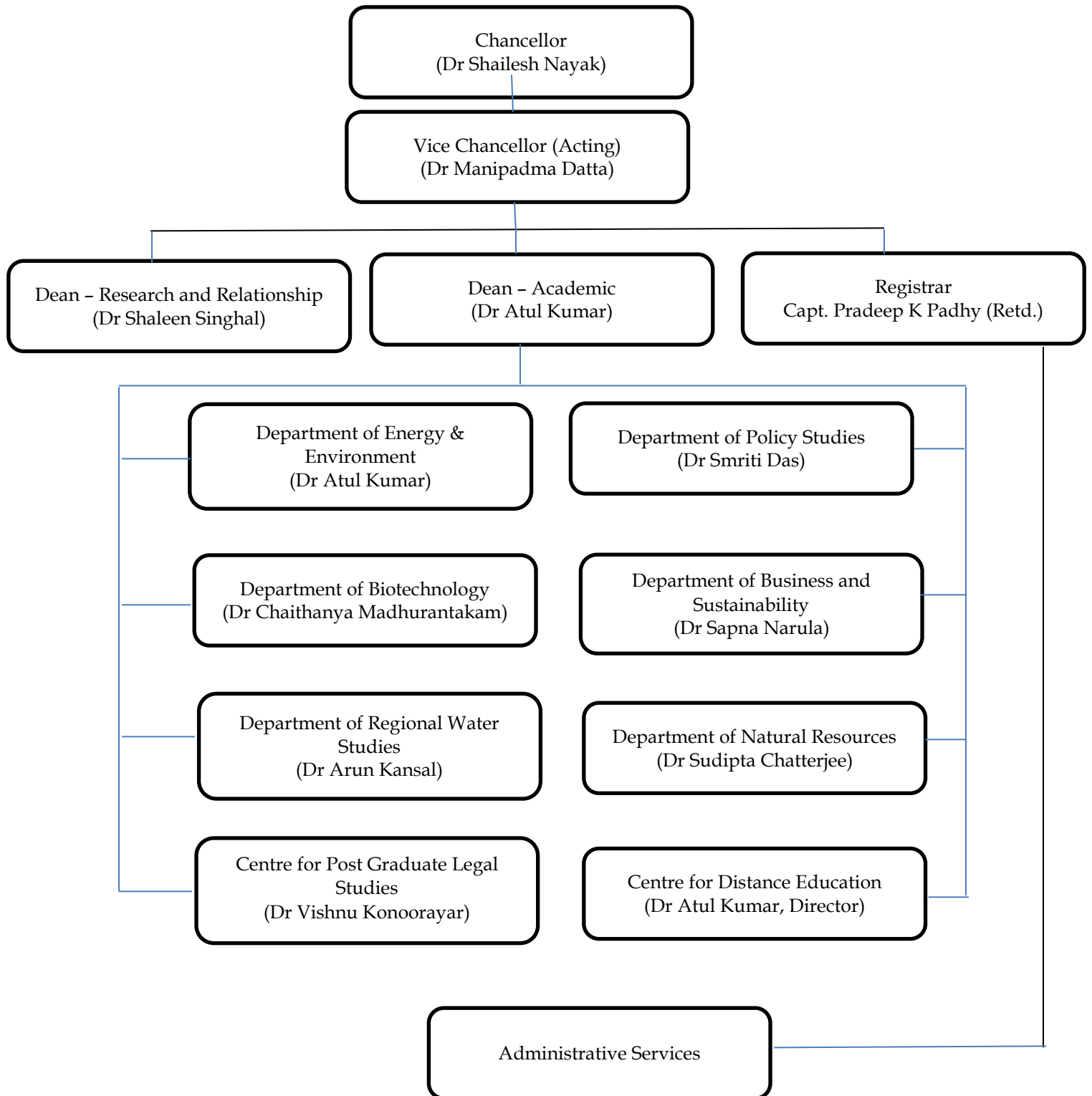
TERI SAS (earlier TERI University) was established to disseminate the vast reservoir of knowledge devised by The Energy and Resources Institute (TERI), a not-for-profit, independent research institute recognized globally for its contribution to scientific and policy research in the realms of energy, environment, and sustainable development. The Institute's academic offering is rooted in the comprehensive research, consultancy and outreach activities of TERI.

In 1999, the Institute was granted the 'Deemed to be University' status by the University Grants Commission (UGC) and notified vide the Ministry of Human Resources Development, Department of Education, Government of India, notification no. F.9/19/95-U-3, dated October 5, 1999.

Since its inception, the Institute has offered not just world-class education, but also an environment that enables its students to develop fresh perspective in their subject areas. Before moving to Vasant Kunj, the institute was housed in the Darbari Seth Block of India Habitat Centre from 1998 to 2008. In 2008, TERI SAS started functioning from its new 'Green Campus', located in Vasant Kunj, New Delhi.

TERI SAS aspires to be an institution of advanced learning which meets the needs of a rapidly growing nation. The academic programmes are envisioned to provide the students with a holistic and inter-disciplinary perspective of the subjects offered.

## TERI SAS Structure



## **BOARD OF MANAGEMENT**

### **CHAIRMAN**

Dr Manipadma Datta

Professor & Vice Chancellor (Acting), TERI SAS

### **DEANS**

Dr Atul Kumar

Professor & Dean (Academic), TERI SAS

Dr Shaleen Singhal

Professor & Dean (Research & Relationship), TERI SAS

### **THREE EMINENT ACADEMICIANS NOMINATED BY CHANCELLOR**

Dr Eswaran Somanathan

Professor, Indian Statistical Institute

Dr George John

Former Vice Chancellor, Birsa Agricultural

University, Ranchi and Former Sr. Advisor, DBT, Govt. of India

Dr Sachin Chaturvedi

Professor & Director General, Research and Information System for Developing Countries (RIS)

### **NOMINEE OF SPONSORING SOCIETY**

Mr R R Rashmi, Distinguished Fellow & Programme Director, TERI

Dr Nimmi Singh, DGM (Chem.) – PM, Oil and Natural Gas Corporation Limited

Dr Bhim Singh, Chair Professor, Department of Electrical Engineering , Indian Institute of Technology, Delhi

Dr V.P. Singh, Professor, Regional Rep for South Asia International , Centre for Tropical Agriculture

TWO TEACHERS (FROM PROFESSOR AND ASSOCIATE PROFESSOR)

Dr Ramakrishnam Sitaraman, Professor, TERI SAS

Dr Vishnu Konoorayar, Associate Professor, TERI SAS

SECRETARY

Capt. Pradeep Kumar Padhy (Retd.), Registrar, TERI SAS

## THE ACADEMIC COUNCIL

### CHAIRPERSON

Dr Manipadma Datta, Professor & Vice Chancellor (Acting), TERI SAS

### DEANS

Dr Atul Kumar, Professor & Dean (Academic), TERI SAS

Dr Shaleen Singhal, Professor & Dean (Research & Relationship)

### HEADS OF THE DEPARTMENTS

Dr Shaleen Singhal, Professor, Department of Energy & Environment

Dr Sudipta Chatterjee, Department of Natural Resources

Dr Shashi Bhushan Tripathi, Department of Biotechnology

Dr Smriti Das, Department of Policy Studies

Dr. Vishnu Konoorayar, Centre for Post Graduate Legal Studies

### PROFESSORS

Prof. Prateek Sharma

Prof. Sitaraman Ramakrishnam

Prof. Anandita Singh

### TWO ASSOCIATE PROFESSORS FROM DEPARTMENTS

Dr Sukanya Das

Dr Vinay S. Prasad Sinha

### TWO ASSISTANT PROFESSORS FROM THE DEPARTMENT BY ROTATION OF SENIORITY

Dr Nithiyanandam Yogeswaran

Dr Akash Sondhi

### THREE PERSONS NOMINATED BY THE VICE-CHANCELLOR

Dr T C Kandpal

Dr Malathi Lakshmikumaran

Mr Rakesh Mehrotra

CO-OPTED MEMBERS

Dr Vivek Suneja

Dr Anubha Kaushik

Ms Ranu Kayastha Bhogal

SECRETARY

Capt. Pradeep Kumar Padhy (Retd.)

## Student and Faculty Strength

<b>from July 1, 2019- June 30, 2020</b>	
Particular	No. of Faculty
Core Faculty	47
Adjunct Faculty	20
Visiting Faculty	26

<b>from July 1,2019-June 30,2020</b>	
Program name	No. of students
PhD	32 <sup>1</sup>
M.Sc.	113
MBA	21
MA	42
M.Tech.	41
LL.M.	23
PGD	33
Certificate	

---

<sup>1</sup> New admissions in Ph.D

## Programmes Offered

At present, the following programmes are offered at TERI SAS:

- Ph.D. (Bioresources and Biotechnonology)
- Ph.D. (Business Sustainability)
- Ph.D. (Energy and Environment)
- Ph.D. (Natural Resources and Management)
- Ph.D. (Policy Studies)
- Ph.D. (Water Science and Governance)
- Ph.D. (Legal Studies)
- M.Sc. (Environmental Studies and Resource Management)
- M.Sc. (Geoinformatics)
- M.Sc. (Climate Science and Policy)
- M.Sc. (Plant Biotechnology)
- M.Sc. (Economics)
- M.Sc. (Water Science and Governance)
- M.A. (Public Policy and Sustainable Development)
- M.A. (Sustainable Development Practice)
- MBA (Infrastructure)
- MBA (Business Sustainability)
- M.Tech. (Renewable Energy Engineering and Management)
- M.Tech. (Urban Development and Management)
- M.Tech. (Water Resources Engineering and Management)
- LL.M. (Specialization in Environment and Natural Resources Law; and Infrastructure and Business Law)
- PG Diploma (Water Science and Governance)
- CWSG (Certificate Course in Water Science and Governance)
- PG Diploma (Public Policy and Sustainable Development)

### **Ph.D. (Bioresources and Biotechnology)**

The Doctoral programme in Bioresources and Biotechnology provides a highly academic, knowledge-driven environment that will create scientific talent and innovative minds capable of applying knowledge to benefit society and contribute to its welfare. The programme creates capacities for pursuing careers in industry by imparting a wide variety of skills to students. A collaborative inter-disciplinary effort between industry and academia is envisioned wherein manpower will be trained in accordance with the changing needs of industry.

### **Ph.D. (Business Sustainability)**

The Doctoral Program is intended to encourage meaningful research on issues that have a potential fallout on the sustainability of the business. The research focus inter alia includes business management problems; sustainable business strategies; financing and management of infrastructure, business modelling for emerging markets, sustainability financing, environmental, social and governance factors in business, business ethics; corporate social responsibility and the like.

### **Ph.D. (Energy and Environment)**

The Doctoral programme at the Department of Energy and Environment (DEE) is an interdisciplinary programme that aims to address the challenges relating to energy and environmental resource management through teaching, research and capacity building.

The programmes aim to create a cadre of trained professionals committed to bring positive change through scientific, technological and policy innovations for strengthening resilience in communities.

### **Ph.D. (Natural Resources and Management)**

The Doctoral programme is offered by the Department of Natural Resources. The department aspires to advance and impart knowledge about the environment and natural resources, including their characteristics and dynamics, their economic and societal values and their management in an ecologically, socially, technically, and economically sound and sustainable manner.

The Doctoral programme prepares students to meet the changing needs of society for effective and integrated environmental management. The courses equip them with cutting edge tools and techniques through teaching and research. The Department's areas of research include remote sensing, GIS, GPS, forestry, applied ecology, landscape ecology, biodiversity assessment, conservation and characterization and related fields.

### **Ph.D. (Policy Studies)**

The Department of Policy Studies embraces the philosophy that policy level recommendations for sustainable development can follow only from rigorous research that engages with alternative strands/schools of thought across disciplines. The doctoral research agenda at the Department is advanced by its multi-disciplinary team of faculty members with specializations in anthropology, economics, management, development studies, sociology and demography. Their research interests, under the core theme of public policy, cuts across various aspects of ecology-economy-society interface.

### **Ph.D. (Water Science and Governance)**

Coca-Cola Department of Regional Water Studies at TERI SAS offers both full time and part time Ph.D. programmes in Water Science and Governance. Over the years, there has been growing pressure on the water systems leading to precarious balance between various competing uses of water. Rapid population growth and climate change has further added to water woes and conflicts at all levels. There is a growing consensus among the stakeholders to adopt an interdisciplinary approach to sustainable water management. The change management however requires an in-depth understanding of complex water-related issues through basic as well as applied research to influence the decision maker and planners.

### **Ph.D. (Legal Studies)**

The Centre for Post Graduate Legal Studies at the TERI School of Advanced Studies offers PhD programmes in Legal Studies in areas related to sustainable development. The preferred areas of research interests are: Law and Sustainable Development, Infrastructure, Law & Sustainable Development, Corporations, Law and Sustainable Development, Natural Resources, Dispute Resolution and Law, International Trade Law and Sustainable Development, International Investment Law and Sustainable Development and Mining, Law & Sustainable Development. The doctoral programme aims at creating a cadre of professional who can ensure sustainable development with the help of effective implementation of existing laws apart from aiding in the formation of more laws.

### **M.A. (Public Policy and Sustainable Development)**

Policy decisions by government officials at all levels are required to be increasingly multifaceted, with careful considerations of the dynamics of economic reforms and the need to ensure that decision making contributes to sustainability of the development process. Private, not-for-profit, and for-profit business entities also have a bearing on development-related policy decisions. To respond effectively to these issues, civil servants and those engaged in the non-governmental

sectors need to be trained in politics and economics of public policy and in sophisticated methods and tools of analysis; and refresh their knowledge of the substantive development issues at hand.

The M.A. (Public Policy and Sustainable Development) programme, offered by TERI SAS, encompasses a comprehensive and well-structured two-year curriculum on public policy formulation, analysis, evaluation, management, and links with development concerns.

With a judicious mix of courses covering basic concepts, a practical orientation, and new methodologies and tools, the programme intends to allow future leaders in the government and other agencies to enhance their awareness about the overall public policy environment, in which they have to take decisions. The programme is also intended to sharpen the understanding of effects that policy decisions have on political, economic, social, and environmental aspects in domestic as well as in international domain.

### **M.A. (Sustainable Development Practice)**

The M.A. programme in Sustainable Development Practice seeks to address a critical gap in sustainable development education in South Asia. It aims to develop an international cadre of development professionals, well equipped to tackle interwoven challenges of poverty, diseases, climate change, and ecosystem vulnerability specific to the region. This programme is part of the Global Association of Masters of Development Practices (MDP) programmes, which consists of 26 programmes offered in 19 universities across the world.

TERI SAS was one of the few universities selected worldwide by the John D and Catherine T MacArthur Foundation to receive seed funding to create the new Masters degree programme in development practice. The programme provides an interface between the students of 26 MDP programmes and is reviewed by a team of experts from academia and national and international development organizations.

### **MBA (Business Sustainability)**

Businesses across the globe are realizing the importance of integrating sustainability into business practices. Much of the pressure is coming in through various stakeholders, such as customers, shareholders, and the government. This has created a need for managers in different sectors — public, private and not-for-profit, to maintain a balance between three pillars of sustainability, i.e., people, planet, and profits. Having management professionals trained in sustainability within the organization not only optimizes business operations but also generates positive returns to the company. MBA in Business Sustainability at the TERI SAS equips students with acumen to lead in a resource-sensitive world amid increasing competition and concern for

sustainable development. This is not just an MBA programme, it is an MBA plus programme, which combines conventional MBA curriculum with new sustainability challenges that have direct impact on a firm's future performance financial and/or otherwise.

### **MBA (Infrastructure)**

Infrastructure is the backbone of a nation's economy, and tackling infrastructure problems is a key requirement for leveraging growth, especially in developing economies like India. Investments in infrastructure have become crucial in order to sustain the pace of economic growth. This has created a need for managers to lead and sustain organizations involved in infrastructure business.

TERI SAS is the first institute in the country to offer an MBA programme in Infrastructure. The programme not only imparts managerial skills in core subjects like any other conventional MBA course but also equips the students with acumen in infrastructure management by offering sectoral electives in water, energy, and urban infrastructure. The aim is to achieve a critical mass of expertise for effective management of infrastructure challenges across the country. The MBA (Infrastructure) programme at the TERI SAS encompasses a comprehensive and well-structured curriculum. It provides specialized training in infrastructure service delivery, regulatory processes, and competition policy, as well as in understanding infrastructure management from technical, economic, social, legal, and political perspectives. The programme is open to both mid-career professionals and fresh graduates.

### **M.Sc. (Climate Science and Policy)**

There is a need to understand climate science, impact of climate change on various regions, resources, societies, and to study ways of mitigating as well as adapting to climate change. Role of policies and measures are also equally important.

TERI SAS offers an intensive four-semester M.Sc. programme in Climate Science and Policy intended to imbue present and future professionals with practical and theoretical knowledge in the area of scientific and policy issues relevant to climate change. The programme is indeed a need of the hour, an area that requires incentivization, projections, possible ways of mitigating emissions, and assessment of possible impacts on humans, habitats, resources, and exploring adaptation options.

The programme provides explicit inter-disciplinary knowledge and training in adaptation and mitigation issues, and understanding of tools and techniques relevant to the subject. Moreover,

it enhances the understanding of national and international policies, and laws and regulations applicable to climate science and policy.

### **M.Sc. (Economics)**

Climate change and sustainable use of energy resources for future have been globally recognized among the most serious concerns facing mankind today. Economics as a discipline has responded to these challenges by incorporating these issues in standard theory and analysis. In various national and international forums where such issues are discussed, the opinions of economists are much sought after; in other decision-making or policy-making bodies, economists trained in environment and resource economics are expected to contribute by offering specialized insights.

The M.Sc. programme in Economics with specialization in Environmental and Resource Economics examines the application of economic theory to ecological, environmental, and natural resource issues within an interdisciplinary setting. This sub-discipline attempts to understand, analyze, and evaluate the exchanges between nature and human society.

It aims to design and implement policy instruments that assist in sustaining and enhancing quality of life on Earth. The core elements of the programme not only include advanced graduate level exposure to microeconomics, macroeconomics, mathematics, statistics, and econometrics, but our students also receive an in-depth knowledge of concepts, theories, techniques, policies, and other applications in ecological, environmental, and natural resource economics. This domain knowledge makes this programme an MSc (Economics) Plus.

### **M.Sc. (Environmental Studies and Resource Management)**

This programme is intended to create a cadre of trained professionals who are equipped to deal with scientific, technological, legal, socio-economic, and policy aspects related to environment and resource management. The curriculum has been designed seamlessly by integrating the concept of sustainable development in an inter-disciplinary framework with emphasis on research and application. It addresses the growing need for professionals in society who can apply best management practices drawn from various disciplines to create innovative solutions for a sustainable future.

The Environmental Studies and Resource Management programme is a mix of theory and practical components offered in an interdisciplinary approach with emphasis on research and application. The pedagogy of the programme includes face-to-face interactions, live case studies,

field visits, theatre, conferences, seminars, and active use of information and communication technology. It trains students in sustainability and empowers them to become responsible global citizens.

### **M.Sc. (Geoinformatics)**

Geoinformatics is rapidly evolving as a study area that can bring in additional and meaningful insights using multi-disciplinary approach to problem solving in areas such as resource estimation and assessments, impact assessments, etc. It equips students with technologies that can support estimation, mapping, and analysis. The M.Sc. programme in Geoinformatics at the TERI SAS is a two-year programme where students specialize in the areas of geoinformation and earth sciences.

The core strength of the programme lies in its innovative e-curriculum that imbues present and future professionals with practical and theoretical knowledge in the domain of geoinformatics. Students are exposed to a wide range of cutting-edge applications of geospatial techniques to emulate real-life problems. The programme is extensively lab oriented.

Students are exposed to a wide range of practical exercises covering different applications of remote sensing, GIS, photogrammetry to real-life problems, law and policy for remote sensing and mapping. It enables students to understand various rules and regulations regarding data collection and dissemination and learn about various laws and policies related to environment.

### **M.Sc. (Plant Biotechnology)**

The Department of Biotechnology at TERI SAS was established to facilitate capacity building in the field of biotechnology and to address prevailing lacunae in education policies that are critical for its balanced promotion. The Department focuses on inculcating scientific temper, analytical reasoning, original creative thinking, and logical thought process critical for research. It promotes sensitization to issues concerning ethics, regulations, and management vital to biotechnology.

The M.Sc. programme in Plant Biotechnology seeks to provide education and training, empower students with technical skill-set, create capacities and build career opportunities in three key domains of biotechnology – research and development; Science education; and policy, regulations, and management.

This is achieved through a combination of interdisciplinary curricula as well as intensive laboratory work. Students are expected to have both specialized knowledge and practical experience for addressing contemporary problems in both academic and industrial setting.

### **M.Sc. (Water Science and Governance)/ M.Tech. (Water Resources Engineering and Management)**

Water governance and management goes beyond traditional field of engineering because of multi-level (local, regional, and sub-national) and multi-dimensional (economic, social, and environmental) factors. The Department aspires to provide a platform for various actors to come together for innovative ideas, capacity building, and consensus building for joint action on water challenges of tomorrow.

The Department has attained leadership position in offering programmes relevant for development professionals (fresh as well as mid-career) well equipped to tackle, beyond cultural boundaries and across sectoral divisions, the interwoven challenges of water sustainability. The format of the entire programme is flexible and caters to fresh graduates as well as working professionals who desire to upscale their skills/qualifications. It is a multi-track course offering M.Sc/M.Tech/PG Diploma/PG Certificate in Water Science and Governance. While M.Tech. and M.Sc. courses are for four semester duration; PG Diploma is a course for two semesters, and PG Certificate is a one-semester programme.

The programme facilitates a systematic amalgamation of widespread knowledge on a common platform. The course structure addresses cross-sectoral perspectives on both engineering as well as social needs of water, while understanding that sustainability will not be compromised. Students get an opportunity to work on innovative solutions during the major project tenure.

### **M.Tech. (Renewable Energy Engineering and Management)**

The TERI SAS offers multidisciplinary, postgraduate programme in Renewable Energy Engineering and Management to fulfill the increasing demand for trained professionals in the field of renewable energy and energy management. In 2009, the Department ventured into offering various online (distance learning) programmes as well. These online programmes were developed in collaboration with the Open University, UK.

The Department collaborates with International universities such as Brandeis University, USA; Deakin University, Australia; Queensland University of Technology, Australia; Freie University, Germany; and Simon Fraser University, Canada to provide state-of-the-art knowledge on new and emerging developments in energy technologies, methodologies and tools for evaluation, assessment, and decision making. Postgraduate programmes of the Department are AICTE and DEC approved.

M.Tech. (REEM) programme prepares the students in theoretical as well as practical aspects of renewable energy technologies, energy conservation, and management. This multi-disciplinary

integrated programme trains the students not only in renewable energy technologies and its implementation but also in equally important areas of energy infrastructure, rational use of energy, energy policies and regulations, energy–environment interface, etc. The programme exhibits its uniqueness fostering the much sought-after leadership skills through the management energy courses. Thus, the programme enables students to tackle practical problems of design, development, deployment in the industry, and to pursue academics as well as frontiers of research.

Overarching emphasis is given towards practical learning thus exposing students to industrial projects through field visits and internships. Hands-on experience in industrial, consulting, and research projects is imparted while working in various organizations during minor and major internships/projects.

### **M.Tech. (Urban Development Management)**

Rapid urbanization across the world and particularly in developing countries like India has multifarious ramifications on the settlement systems. Pressures on land, water, material needs, and environmental resources would undoubtedly increase and call for integrated and sustainable solutions that cut across disciplinary domains of science, technology, and social sciences.

The M.Tech. programme in Urban Development Management (UDM) at the TERI SAS equips students with cutting edge technical skills; managerial capabilities; and understanding of social, economic, environmental, and legal issues associated with urban development; infrastructure and the real estate sector.

The uniqueness of this programme is in promoting learning through research-based teaching, engagement of practitioners, and a diverse pedagogy ranging from classroom teaching, tutorials, case study discussions, and field work. The programme builds capacity for understanding real-world urban development and management problems and plausible sustainable solutions through engagement of students with institutions concerned with urban development. The programme prepares students for a successful career in the urban development sector such as:

- Urban local bodies, state governments, and other public sector institutions involved in delivery of urban infrastructure and services
- Institutions conducting research, training, and capacity-building activities
- Private sector organizations engaged in real estate and urban infrastructure development
- Consultancy firms, NGOs, and CBOs participating in urban development activities.

## **LL.M.**

Environmental Laws and Infrastructure laws are two emerging fields in legal practice. There is a dearth of qualified legal professionals in both these fields. It is in this context that TERI SAS introduced a one year LL.M. programme with specialization in Environment and Natural Resources Law; and Infrastructure and Business Law.

### **Environment and Natural Resources Law**

The environmental concerns need to be integrated into all economic policies and implementation decisions. A specialization in Environment and Natural Resources Law therefore assumes great significance. The primary focus of this specialization stream is to understand how the legal framework can reorient economic activity toward sustainability. This reorientation can happen in different ways like prohibiting or regulating environmentally damaging activities, assigning liability for environmental harms and providing adequate incentives for benign environmental activities. The course will also address the principles of allocation of natural resources according to the concepts of due process of law and equity.

### **Infrastructure and Business Law**

India's infrastructure development is inadequate and there is a need for massive investment in different infrastructure sectors to meet the demands of economic growth. However, given the fiscal constraints, the investment needs of infrastructure cannot be met by the public sector alone and would require private investment, both foreign and domestic. Attracting private investment will be feasible only if there is a conducive and predictable legal regime.

This programme addresses the policies and laws relating to major sectors viz., transport, energy, telecommunications, urban infrastructure and water.

The purpose of this programme is to provide an insight into the fundamental legal concepts relating to business in general and various infrastructure sectors in particular including the issues involved in the development, financing and management of projects. It also addresses the issues of public-private participation in detail.

## **PG Diploma (Water Science and Governance)**

TERI SAS offers PG Diploma programme in Water Science and Governance to fresh graduates as well as working professionals. The students need to complete 1st and 2nd Semester to be

awarded a P.G. Diploma. It is a well-integrated and holistic programme offered by trained professionals. The programme framework is interdisciplinary in nature and in consonance with the UN International Year of Water cooperation promulgated by the United Nations General Assembly in 2013 and priorities defined in India's National Water Mission that advocates water cooperation by bringing in cultural, educational, scientific as well as religious, ethical, social, political, legal, institutional and economic dimensions.

### **CWSG (Certificate Course in Water Science and Governance)**

TERI SAS offers Certificate programme in Water Science and Governance to fresh graduates as well as working professionals. Over the years, there has been growing pressure on the water systems leading to precarious balance between various competing uses of water. Rapid population growth and climate change has further added to water woes and conflicts at all levels. There is a growing consensus among the stakeholders to adopt an interdisciplinary approach to sustainable water management.

### **PG Diploma (Public Policy and Sustainable Development)**

The PG Diploma (Public Policy and Sustainable Development) - programme, offered by the TERI SAS encompasses a comprehensive and well-structured one-year curriculum on public policy formulation, analysis, evaluation, management, and links with development concerns.

Policy decisions by government officials at all levels are required to be increasingly multifaceted especially in the light of economic reforms and the need to ensure that decision-making contributes to sustainability in the development process. Private not-for-profit and for-profit business entities also have a bearing on development-related policy decisions.

To respond effectively to these issues, civil servants and those engaged in the non-governmental sectors, need to be trained in the politics and economics of public policy and this gives them a better understanding of substantive development issues at hand.

## Convocation 2019

TERI SAS organized its tenth convocation on 14 November 2019. The ceremony was held with much pomp and show. During the Ninth Convocation ceremony, a total of 19 Doctoral degrees and 229 Master's degrees were conferred.

### Medals for Standing First

Ishita Sinha	MA (Sustainable Development Practice)	2019
Sanchit Sethi	M.Sc. (Economics)	2019
Anju Bhaskaran	M.Sc. (Water Science and Governance)	2019
Shinjini Singh	M.Tech (Renewable Energy Engineering and Management)	2019
Sakshi Ghildiyal	M.Sc. (Environmental Studies and Resource Management)	2019
Soumya Sharma	M.Sc. (Plant Biotechnology)	2019
Mohita Taneja	MBA (Business Sustainability)	2019
Sucheta Bhattacharjee	M.Sc. (Geoinformatics)	2019
Pusapati Chandana	M.Sc. (Climate Science and Policy)	2019
Priya Upadhyay	M Tech (Urban Development and Management)	2019
Divyansh Upadhyay	M Tech (Water Science and Governance)	2019
Raminder Gill (2018-2019)	Master of Laws (Environment and Natural Resources Law)	2019
Deepak Virmani	MA (Public Policy and Sustainable Development)	2019

## Guest Lectures at the Institute

TOPIC	PRESENTER	DATE
Comparative Perspectives of Urban Climate Adaptation	Dr. Eric Chu - School of Geography, Earth and Environmental Sciences, University of Birmingham, UK	27.03.2019
Circular Economy	Janardhanan Ramanujalu - Vice President & Regional Head for SABIC, South Asia	03.04.2019
Plutonium for Energy? Lessons for India from Abroad	Dr. Alan J Kuperman - Assoc. Professor, LBJ School of Public Affairs, University of Texas at Austin	08.08.2019
Debate on the Abrogation of Article 370	Dr. Aman M. Hingorani - Author & Advocate-on-Record, Supreme Court of India Mr. Prashant Padmanabhan - Advocate-on-Record, Supreme Court of India	14.08.2019
Your Health... Your Choice..!!	Prof. Rima Dada - Professor, Department of Anatomy, All India Institute of Medical Sciences (AIIMS), New Delhi	21.08.2019
Integrated Assessment of the Water-Energy-Land Nexus	Dr. Simon Parkinson - Research Scientist, International Institute of Applied Systems Analysis (IIASA), Luxenburg, Austria	09.09.2019
Towards the 6 <sup>th</sup> IPCC Assessment Report: Progress and Perspectives	Prof. Angel de la Vega Navarro - Professor of Economics, National Autonomous University of Mexico	09.10.2019
Air pollution and its Impacts by WRI India	Dr Ajay Nagpure - Head, Air Pollution of Sustainable Cities Program, WRI India	23.10.2019
Climate Risk Adaptation	Mr. Kirtiman Awasthi - Senior Policy Advisor on Climate Adaptation and Climate Finance, GIZ India	06.11.2019
Taking your Engineering Qualification to the Next Level	Prof. Jeffrey Walker - Professor and Head, Department of Civil Engineering, Monash University, Melbourne, Australia	11.11.2019
Natural Resource Management with Community Participation	Prof. S.P. Mittal - retired Principal Scientist of Central Soil and Water Conservation Research and Training Institute, Chandigarh	22.01.2020
Intellectual Property Rights and Sustainable Development	Mr. G. R. Raghvender, Joint Secretary, Department of Justice, Ministry of Law and Justice, Govt. of India	05.02.2020
The Metabolism of Islands: <i>An Industrial Ecology Perspective</i>	Prof. Simron Singh, Associate Professor, School of Environment, Enterprise and Development, University of Waterloo, Canada	11.03.2020

## List of Publications

Staff_name	Dept.	Publication_type	Author	Year	Title_of_work	Published In/Conference
Vinay S P Sinha	DNR	Journal Article	Nehru Machineni, Vinay S.P.Sinha, Prasoon Singh, N.T.Reddyc	2020	The impact of distributed landuse information in hydrodynamic model application in storm surge inundation	Estuarine, Coastal and Shelf Science
Sapan Thapar	DEE	Journal Article	Sapan Thapar and Seema Sharma	2020	Factors impacting wind and solar power sectors in India: A survey-based analysis	Sustainable Production and Consumption
Manipadma Datta	DBS	Chapter in Books/Handbooks	Shinu Vig and Manipadma Datta	2020	Corporate Governance Role of the Board Committees in India.	Corporate Governance Models and Applications in Developing Economies
Prateek Sharma	DEE	Journal Article	Swati Kwatra Archna Kumar Prateek Sharma	2020	A critical review of studies related to construction and computation of Sustainable Development Indices	Ecological Indicators
Atul Kumar	DEE	Journal Article	Michael O.Dioha and Atul Kumar	2020	Sustainable energy pathways for land transport in Nigeria	Utilities Policy
Sukanya Das	DPS	Journal Article	Aaina Dutta and Sukanya Das	2020	Adoption of grid-connected solar rooftop systems in the state of	Energy Policy

					Jammu and Kashmir: A stakeholder analysis	
Tanu Sri (Student)		Journal Article	Tanu Sri, Bharat Gupta, Shikha Tyagi, Anandita Singh	2020	Homeologs of <i>Brassica SOC1</i> , a central regulator of flowering time, are differentially regulated due to partitioning of evolutionarily conserved transcription factor binding sites in promoters	Molecular Phylogenetics and Evolution
Sapna A Narula	DBS	Journal Article	Anupriya Sharma and Sapna A. Narula	2020	What motivates and inhibits Indian textile firms to embrace sustainability?	Journal of Sustainability and Social Responsibility
Ram Kumar Singh (Student)		Journal Article	Ram Kumar Singh, Vinay Shankar Prasad Sinha, Pawan Kumar Joshi & Manoj Kumar	2020	Environmental Monitoring and Assessment	
Nandan Nawn	DPS	Book Review			Downscaling of Economic System	
L N Venkataraman	DPS	Book Review			Entrepreneurial Academics And Ailing Humanities	
Nandan Nawn	DPS	Book Review			Natural Resources And Institutions	

# List of Memorandums of Understanding (2019-20)

University of Science, Engineering and Technology, Gambia	Exchange of faculty members, students, exchange of publications, joint research projects, conferences, capacity building programs etc.
CPWD, New Delhi	Exchange research papers and reports, execution of research projects, scholarly publications, patents and participation at conferences, training of officials, etc.
Lomonosov Moscow State University	Exchange of faculty members, students, joint research proposals, collaborative programmes, promote research and innovation in climate change and ecology area, etc.

### Honorary Doctoral Degrees Awarded

Name	Designation
Dr. Krishnaswamy Kasturirangan	Chancellor of Central University of Rajasthan and a former Chancellor of Jawaharlal Nehru University

## Ongoing Doctoral Research <sup>2</sup>

Ongoing Doctoral Research (July 1, 2019-June 30, 2020)			
S.No.	Name	Supervisor	Topic of Research
1	Ranjana Ray Chaudhuri	Dr Prateek Sharma	A framework for updating intensity duration frequency curves for storm events
2	Anupriya Sharma	Dr Sapna Narula	A Study of Environmental and Social Practices in Indian Textile Industry
3	Shivanshu Sharma	Dr Naqui Anwer	A study of necessity, challenges and framework of electric vehicles in India
4	Sulaksha Shetty	Dr Manipadma Datta	A study on organisation and its leadership for sustainable development with particular reference to the Indian situation
5	Himanshu Arora	Dr Sapna Narula	A study on sustainability reporting process & practices of energy sector
6	Nipun Bhargava	Dr Arun Kansal	Advanced Oxidation Process based Technological Intervention for treatment of Wastewater Streams
7	Ram Kumar Singh	Dr Vinay S P Sinha	Agricultural land dynamics in SAARC nations: relevant to food security in climate change scenarios
8	Divya Jain	Dr Gopal Sarangi	An assessment of climate change effects on household electricity consumption and consequent adaptation choices in India
9	Yogesh Tyagi	Dr Shaleen Singhal	An assessment of relationship between MRTS and real estate values: Case study of Delhi
10	Sourabh Jain	Dr Shaleen Singhal	An evaluation of carrying capacity based system dynamics approach towards emerging cities: Case studies for Surat and Chandigarh
11	Priya Bhatnagar	Dr Vishnu Konoorayar	Analysing Legal and Regulatory Framework Governing Interaction between Competition Law and Indian Coal Sector
12	Prabhakaran T R	Dr Sukanya Das	Analysis of climate impact on the rice productivity and its adaptation strategies
13	Keilash Chirom	Dr Pallavi Somvanshi	Analysis of complex hidden patterns in cancer: A systems biology approach
14	Malar Kodi	Dr Naqui Anwer	Analysis of temperature and wind conditions effects on transmission line: Power flow and line failure in Indian condition and Standard
15	Sonal Bindal	Dr Chander Kumar Singh	Arsenic vulnerability in the Upper Gangetic Plains

<sup>2</sup> The list is only of those students who have completed their comprehensive.

16	Lokesh Chandra Dube	Dr Sudipta Chatterjee	Assessing carbon and livelihood impacts of selected carbon forestry projects in India
17	Sonia Grover	Dr Shresth Tayal	Assessing climate change impacts on water availability patterns in a mountain catchment
18	Pradeep Vashisht	Dr Shresth Tayal	Assessing energy balance of high altitude glaciated basin in the North-Western Himalayas
19	Ayushi Vijhania	Dr Vinay S P Sinha	Assessing influence of climate change on water availability and distribution on vulnerable communities in Central Himalaya
20	Sanjukta Mudgal	Dr J V Sharma	Assessment of Implementation of Forest Rights Act in Madhya Pradesh
21	Tanya Sharma	Dr Prateek Sharma	Assessment of the nexus between built environment, travel behaviour, air quality, and human health to re-inform the transport system
22	Pratyaya Jagannath	Dr Chubamenla Jamir	Assessment of the Sustainability of shifting cultivation in Nagaland
23	Chandni Bedi	Dr Arun Kansal	Assessment of water management for urban liveability and sustainable cities
24	Swati Singh	Dr Shresth Tayal	Assessment of Water-Energy-Food inter linkage in urban areas and developing a framework for adaptation
25	Simran Kaur	Dr Anandita Singh	Biochemical characterization and comparative functional analysis of the SOC1 promoter homologs in Brassica juncea
26	Gurbir Kaur Sidhu	Dr P M Reddy	Bioengineering of cyanobacterial CO <sub>2</sub> -Concentrating Mechanism (CCM) in Rice (Oryza Sativa)
27	Nanditha Krishnan Vimalakumari	Dr P M Reddy	Bioengineering of rice for improved phosphorus use efficiency
28	Himanshu Chaturvedi	Dr Arun Kansal	Biological treatment of MSW leachate with PVA Gel technology and scale up Methodology
29	Manjusha Jain	Dr Manipadma Datta	Changing paradigm of public transport infrastructure financing with specific reference to Indian Railways: An exploratory study
30	Kirti Rawat	Dr Shashi Bhushan Tripathi	Characterization of Fusarium fujikuroi isolates causing Bakanae disease of basmati rice and its management through biocontrol agents
31	Nandita Singh	Dr Neeti	Characterization of spatio-temporal dynamics of coastal hazard vulnerability of West Bengal
32	Preeti Rana	Dr Pallavi Somvanshi	Conformational ensembles guided inhibition of prion aggregation

33	Charu Bhanot	Dr Sudipta Chatterjee	Conservation significance of Najafgarh Lake: An urban wetland of Delhi and assessment of its habitat as a refugia of resident and migratory birds
34	Neeraj Dangi	Dr Sapna Narula	Consumer Buying Behavior in organic food and the role of eco-labels
35	Shinu Vig	Dr Manipadma Datta	Corporate governance and sustainable value creation in Business: A study of select Indian firms
36	Amit Kumar Thakur	Dr Manipadma Datta	Corporate Social Responsibility and Business Sustainability in India - In Retrospect and Prospect
37	Anushree Poddar	Dr Sapna Narula	CSR Orientation, Implementation and its relation with Firm Performance - A study of selected firms in India
38	Soumendu Shekhar Roy	Dr Chander Kumar Singh	Defining the nature of metamorphism of the litho-units of Lesser Himalayas (Kumaon) using sensor
39	Tushar Saxena	Dr Manish Kumar Shrivastava	Determination of the carbon price to internalize the external cost of climate change in the economic decision making of companies to guide new investment in low carbon technologies
40	Satyam Kushwaha	Dr Nithiyanandam Yogeswaran	Developing a spatial mitigation strategy to reduce urban heat island impact on urban habitat - A case study on Gurugram
41	Varsha Bisht	Dr Banwari Lal	Developing bacterial and plant-based bioflocants for wastewater treatment
42	Neha	Dr Arun Kansal	Developing framework model for use of reclaimed water in urban areas to address increasing water demand
43	Vivek Kumar Singh	Dr Shashi Bhushan Tripathi	Development of cytoplasmic genic male sterile (CGMS) lines in Bhut Jolokia ( <i>Capsicum chinense</i> x <i>C. frutescens</i> )
44	Gurdeep Kaur	<u>Dr P M Reddy</u>	Development of transgenic rice lines resistant to sheath blight through modulation of lignin biosynthesis pathway genes
45	Sachin Kumar	Dr Prateek Sharma	Diffusion of cleaner production innovation among MSMEs - case study of brick sector in India
46	Sangeeta Agasty	Dr Sapna Narula	Diffusion of cleaner production innovation in MSME sector in India: a study of Drivers and inhibitors in select sectors

47	Amit Pandey	Dr Kavita Sardana	Ecological and Economic Significance of sacred forests of Kachchh, Gujarat, India: An arid biographic province
48	Paromita Das	Dr Vibha Dhawan	Ecosafety Studies of Bare and Modified Titania Nanomaterials used as Adsorbents and Photocatalysts for Efficient Waste Water Treatment
49	Jayalakshmi Paonam	Dr Sudipta Chatterjee	Ecosystem services and institutional mechanism for conservation of loktak lake: A Ramsar site in Manipur
50	Ashmeet Kaur	Dr Venkataraman L N	Education for Peace: Intersectional analysis of Curricular Debates in India
51	Gp Capt A Shajahan	Dr Soumendu Sarkar	Employment of Aerospace Power in Disaster Response: An Analysis of Existing Framework in India
52	Birinchi Bora	Dr Som Mondal	Energy rating and reliability of PV modules
53	Anjulata Singh	Dr P M Reddy	Engineering the modulation signaling pathway in the Rice plant to promote rhizobial infection and nitrogen fixing symbiosis
54	Jagriti Dabas	Dr Som Mondal	Estimation of Agricultural Residue Potential for Renewable Energy Applications Using Integrated Geospatial Technology
55	Karthick R	Dr Sukanya Das	Estimation of economic value of a coastal wetland ecosystem: A case study of Kaliveli wetland
56	Md Ziauddin	Dr Shaleen Singhal	Evaluation of challenges and prospects of urban development: an exploratory research with special reforms to redevelopment in Delhi
57	Pratibha Bisht	Dr Suneel Pandey	Evaluation of Traditional Knowledge and Biocultural Diversity of Nyishi Tribal Community for Sustainable Development in Arunachal Pradesh, India
58	N K Ram	Dr Atul Kumar	Experimental study of Hydrogen enrichment in producer gas through steam, air gasification route
59	Lalit Sharma	Dr Suneel Pandey	Exploring Secondary resource Material (SRM) utilization potential in Indian Automotive Sector, originating from End-of-life Vehicles (ELV's) in National Capital – Delhi
60	Anil Kumar Jain	Dr Ritu Mathur	Exploring the Role of Gas in India's Energy Mix
61	Niharika Tyagi	Dr Smriti Das	Gender and Community Forestry Institutions: Analyzing Gender Roles, Identities and Social Capital in Local Forest Governance

62	Divya Sharma	Dr Kamna Sachdeva	Gendered Vulnerabilities of Climate Change Shocks and adaptive decision making: A study of lower and middle Uttarakhand region
63	Sonal Garg	Dr Piyali Das	High Grade Carbon from Biomass and Waste sources through Pyrolysis Route- Its characteristics and application
64	Shashi Kant Yadav	Dr Gopal Sarangi	Hydraulic Fracturing vis-a-vis Natural Resources in India: Is Indian Legal Framework Ready for Fracking
65	Vinay Kumar Upadhyay	Dr Anu Rani Sharma	Impact Assessment of Crop Residue Burning on Air Quality and Health
66	Tanvi Khurana	Dr Seema Sangita	Impact of Electricity Access on Rural Non-Farm Enterprises
67	Aishwary Gupta	Dr Seema Sangita	Impact of International food standards on Indian Marine Export
68	Mary Abraham	Dr Gopal Sarangi	Impact of Mining Induced Landuse Landcover changes on livelihood
69	Madhurima Waghmare	Dr Shaleen Singhal	Inclusive cities and creative habitats - Exploring the dynamics in context of the diverse Indian cities
70	Karanjot Kaur	Dr P M Reddy	Integration of Nodulation signalling pathway and assessment of its performance in promoting rhizobial symbiosis in rice
71	Priya Bhatnagar	Dr Ramakrishnan Sitaraman	Interaction of Dengue virus non-structural protein 5 with host proteins
72	Aaina Dutta	Dr Sukanya Das	Investigating households preferences for grid connected solar rooftop systems: A case study of Jammu and Kashmir
73	Sahaj Kaur	Dr Sudipta Chatterjee	Lichen Conservation Areas (LCAs) for in situ conservation of lichen species preferred in trade in Uttarakhand, Western Himalayas
74	Sujata	Dr Atul Kumar	Life cycle cost analysis of existing and suggested infrastructure to meet Ethanolblending mandate in India
75	Sibaji Kunti	Dr Chubamenla Jamir	Livelihood Vulnerability of Aml- Scale Fishing Communities to Climate Variability in Indian Sundarbans
76	Amit Jain	Dr Smriti Das	Locating Forest Community in Forest Governance: Cases of Two Villages from Jharkhand, India

77	Shweta Prajapati	Dr Smriti Das	Mainstreaming Climate Change in Development Planning: Analysing local climate governance in Bundelkhand, Madhya Pradesh
78	Badsha Sarkar	Dr Swarup Dutta	Migration in rural areas of Madhya Pradesh and Rajasthan: A study from drought - affected districts of Shahdol and Dungarpur
79	Meenakshi Kumar	Dr Shaleen Singhal	Multifunctionality of urban green infrastructure for the competitive advantage of cities in India
80	Charvi Kapoor	Dr Akash Sondhi	Neglected and Underutilized Crop Species (NUCS) in India: A study on Contribution, Challenges and Prospects
81	Shakti Khera	Dr Shashi Bhushan Tripathy	NIRS prediction modelling and association mapping for biochemical traits related to malting in Barley
82	Dharmesh Kumar Singh	Dr Shresth Tayal	Optimizing Resource use and Reducing Water Footprint of Electricity Generation in India
83	Kamlesh Yadav	Dr Atul Kumar	Optimum Energy Utilization in Decentralized PV System
84	Arun Pratap Golaya	Dr Nithiyanandam Yogeswaran	Overcoming fundamental challenges in Marine Vessel Tracking through suitable use of emerging information and communication technology (ICT) in the maritime domain: Safety and Security Perspective
85	Renu	Dr Atul Kumar	Performance Modelling and Systematic Optimization of SPVWPS for different climatic zones for irrigation purpose in India
86	Sanjay Prakash Bhagat	Dr Nandan Nawn	Policy and Regulatory Interventions for Integration of Variable Renewable Energy Sources
87	Naveen Agarwal	Dr Naqui Anwer	Power market in India: Exploring the Grey Areas
88	Sanchi Singh	Dr Sudipta Chatterjee	Provisioning ecosystem services and forest health of Rhododendron rich forests in western himalayas: study of Rhododendron arboreum harvest in Chamoli District for its sustainable use
89	Rishika Singh	Dr Vishnu Konoorayar	Public Participation in Decision Making; A case study of nuclear energy sector in India
90	Md Farhad	Dr Shashi Bhushan Tripathi	QTL mapping for agronomic and phenological traits under early planting in advanced breeding lines of hexaploid wheat
91	Nimisha Singh	Dr Malini Balakrishnan	Recovery of antioxidants from distillery wastewater using Forward Osmosis (FO)

92	Varsha Srivastava	Dr Malini Balakrishnan	Recovery of Bioactive Compounds (Phytochemicals) from Food Processing Waste
93	Akanksha Balha	Dr Suneel Pandey	Runoff Modeling for present & future scebario: a case study of Delhi watershed
94	Nidhi Gautam	Dr Akash Sondhi	Searching for Financial Sustainability of Micro, small and Medium Enterprises (MSMEs) in India: An analysis in retrospect and prospect
95	Jeevan Kumar Jethani	Dr Atul Kumar	Solar Energy for Agriculture: Challenges and Oppurtunities
96	Prasoon Singh	Dr Vinay S P Sinha	Spatiotemporal assessment for disaster risk reduction and climate change adaptation to enhance urban flood disaster resilience
97	I V Rao	Dr Prateek Sharma	Strategy for business sustainability of MSMES in the Indian auto industry: Status and way forward
98	Bhawna Chaudhary	Dr Chaithanya Madhurantakam	Structural and functional characterization of a mycolic acid methyl transferase enzyme of Mycobacterium tuberculosis
99	Rinki Sisodia	Dr Chaithanya Madhurantakam	<i>Structural studies on phosphatases of Helicobacter pylori</i>
100	Swati Patel	Dr Dheeban Chakravarthi Kannan	Studies on commercial viability on microalgae Biofuel production
101	Tanu Sri	Dr Anandita Singh	Study of functional aspects of regulatory evolution in Brassica SOC1
102	Chhabishwar Prasad Patel	Dr Som Mondal	Study of Latent Heat Thermal Energy Storage System for Medium - Temperature Solar Thermal Application
103	Anchala Kumari	Dr Pallavi Somvanshi	Studying role of osmolytes and repurposed drugs in amyloidogenesis
104	Sujeet Kumar Thakur	Dr Udit Soni	Synthesis and charaterization of functionalized carbon nanomaterials and their application in biological systems
105	Asif Nazar	Dr Naqui Anwer	Technical and Economic aspects of Electrical Energy Storage in GridBalancing
106	Snigdha Goel	Dr Arun Kansal	Thermochemical conversion of scrap tyre to high value products: Selected Aspects
107	Amruta Pattnaik	Dr Som Mondal	To explore the metal nano particles of plasmonic enhanced upconversion materials in C-SI Solar cell
108	Ashutosh Kumar Pathak	Dr J V Sharma	Total Economic valuation of Ecosystem provided by Soorsarovar bird century
109	Priyanka	Dr J V Sharma	Total Economic Valuation of Ecosystem Services provided by Sariska Tiger Reserve

110	Colonel Gaurav Singh Karki	Dr Bhawna Bali	Transformation of Military Stations into Smart Liveable Military Stations in India: A Study on Necessity, Challenges and Framework
111	Rohit Sharma	Dr Kamna Sachdeva	Tropospheric Ozone and Aerosols as short lived climate stressors and their Agricultural Vulnerability
112	Nidhi Gupta	Dr Vidya S Batra	Utilisation of red mud as a catalyst for the processing of hydrocarbons to enhance the production of hydrogen
113	Himani Singh	Dr Vinay S P Sinha	Water Accounting framework for Eastern Himalaya in context of Climate Change
114	Gaurang Meher Diljun	Dr Vinay S P Sinha	Water-Energy-Food Nexus in the context of Groundwater Irrigation in semi-arid agriculture zone in India
115	Rajshree Mathur	Dr Shaleen Singhal	What are the linkages/synergy between weekly markets and their associated catchment in a city?

## Honours and Awards

### Students

Mr Ojo Patrick Duke

The M.Sc. (Geoinformatics) student of TERI SAS, Mr Ojo Patrick Duke has made the Institute proud by winning the Esri India Young Scholar Program. The strength of any institution lies in the excellence exercised by its students and it's an honour for TERI SAS that it has been guiding its students on the path of excellence for years now.

Mr Siddhant Kumar

Siddhant Kumar pursuing MBA (Business Sustainability) at TERI School of Advanced Studies, New Delhi, won the best blog award at WSDS 2020 where he opined that 'Sustainable Lifestyles' is more than just an academic term and can be transformed into a way of life. Siddhant's Blog certainly shows us the way on how the nature and humanity can coexist.

Mr Akshat Shrivastava

Mr Akshat Shrivastava, M.Sc. (Environmental Studies and Resource Management) student won 2<sup>nd</sup> position in photography contest at Youth Climate Conclave, WSDS 2020.

Mr Mohd Subhan Khan

Our student, Mr Mohd Subhan Khan represented TERI SAS and SDSN Youth at the ECOSOC Youth Forum 2019 at United Nations, New York. During the programme, Sam Siamak Loni - Global Coordinator of SDSN Youth released 'Year at a Glance' - the review report of the SDSN Youth activities at TERI SAS. Congratulations to all the co-authors and contributors to the report and the program mentors!

Mr Amitav Mandal and Mr Samarth Arora

TERI SAS team led by Mr Amitav Mandal and Mr Samarth Arora stood runner up for 2nd Sustainability Quiz organised by UN global compact. Congratulations to the winners!

## Alumni

Mr Nishant Bhatnagar

TERI SAS alumni from M.Tech. UDM (2016-2018), Mr Nishant Bhatnagar, represented India as the 'World Youth Ambassador of Road Safety' at 2<sup>nd</sup> World Youth Assembly and Global Ministerial Conference on Road Safety 2020.

Mr Samradh Singh Chauhan

TERI SAS alumni, Mr Samradh Singh Chauhan also presented his work on 'Localising SDGs in Small Cities: Challenges and Opportunities' at the event. Mr Samradh Singh Chauhan is the Project Scientist at TRIPP, IIT Delhi and is a TERI SAS, M.Tech. UDM (2016-2018) alumni.

Ms Varsha Bhaskar

One of our alumni, Ms Varsha Bhaskar, an M.Sc. (ESRM) student (2016-2018) at TERI SAS added another feather to our cap as she presented her major research at the prestigious Ecological Society of America. To add the cherry on the cake, her work was also showcased in a program on the famous wildlife channel-The Animal Planet.

Ms Ninika Dhawan

One of our alumni, Ms. Ninika Dhawan, received Smt Kaushalya Narayanan Memorial Medal for Best Lady Officer Trainee, on the Occasion of Passing out Parade of the 69th Batch of Indian Revenue Service (Customs and Central Excise) at the National Academy of Customs, Indirect taxes and Narcotics. She has also been selected for the Climate Force Antarctica Expedition 2020 with Robert Swan, OBE.

Mr David Michael Terungwa

A TERI alumnus, Mr David Michael Terungwa, Executive Director, GIFSEP; Africa Regional Coordinator, CCL and West Africa Coordinator ACRP, has been invited to speak at the 68th United Nations Civil Society Conference, "Building Inclusive and Sustainable Cities and Communities", to take place from 26 to 28 August 2019 in Salt Lake City, Utah, United States.

Ms Sristi Kamal

Ms. Sristi Kamal has been named the new Northwest Senior Representative in Oregon by the non-profit conservation organization, Defenders of Wildlife. Sristi holds a Masters in Environmental Studies from TERI School of Advanced Studies (TERI SAS).

## Student Clubs at TERI SAS

TERI SAS has eight active clubs (a) Dramatics Club, (b) Elocution Club, (c) Eco-Club, (d) Sports Club, (e) Music and Dance Club, (f) Media and Photography Club, (g) Social Cause Club and (h) Entrepreneurship Development Cell.



**Dramatics Club:** Students engage in activities like street plays, drama to spread awareness on sustainability and development issues.

**Elocution Club:** This Club primarily focus on strengthening skills of students in public speaking, confidence building, and overall personality development. Debates, quizzes, JAM sessions, poetry recitation, writing, etc. are some of the activities, which students undertake.

**Eco-Club:** Organizes and celebrates environment-related events and activities, such as 'No Plastic Day,' 'Earth Day,' 'International Youth Day', tree plantation drive, etc. In 2016, Eco-Club introduced 'No Paper Cups' campaign on campus, which was successfully implemented in early 2017. Now every Wednesday has been declared as 'no paper cup day' in TERI SAS.

**Sports Club:** The Intra-Institute Sports Meet is an annual sports extravaganza organized by the TERI SAS Sports Club. It's a two week long event, which includes sports like badminton, table tennis, cricket, athletics, volleyball, football, basketball, and carom. All the sports events take

place in the Institute premises except cricket and athletics, which are held at TERI Gram, Gurgaon. This helps foster healthy sportsman spirit amongst students.

**Music and Dance Club:** This club encourages artistic pursuits and promotes talent of the students. It regularly organizes musical performances by students and artists from outside. It helps develop and hone students' interest in music and traditional/contemporary dance forms.



**Media and Photography Club:** This club helps in creating awareness about the TERI SAS activities and its philosophy to the world outside through the mode of writing and photography.

**Social Cause Club:** This club was set up with the initiative of students of TERI SAS to promote community participation and work towards social cause.

**Entrepreneurship Development Cell (EDC):** This cell emerged from the 'Ideation Club' of the Institute. EDC has been established to promote the spirit of innovation and entrepreneurship among the students of the TERI SAS. Skill building, experience sharing and networking programmes are a regular feature of this cell.

## **Events at TERI SAS**

### **REtopia**

REtopia was started by students from M. Tech Renewable Energy Engineering and Management (REEM) of the Department of Energy and Environment at TERI SAS in the year 2011.

REtopia is the annual technical symposium of the Department of Energy and Environment, TERI SAS and is aimed at bringing together academicians, students, industrialists and experts from diverse backgrounds on one platform to share their knowledge and to discuss the best possible solutions to the present bottlenecks in the implementation of renewable energy programmes.

### **CLIMATES**

CLIMATES is the youth-driven Climate Change Conclave organised by TERI School of Advanced Studies. It was first organised in 2018.

Organized by the students of MSc (Climate Science and Policy), the conclave seeks to provide an insight into the catastrophic impacts of Climate Change on different aspects of Ocean and understand the challenges about mitigation of impacts and developing climate resilience.

The conclave features experts from Climate Science to discuss and link SDG 13 (Climate Action) and SDG 14 (Life below Water) and put into perspective the immediate need to mitigate and adapt to climate change.

### **SWASH**

To generate awareness on the water security issues and suggest strategies to enable communities to become water champions in their sphere of influence and beyond, the Coca-Cola Department of Regional Water Studies organizes a yearly event SWASH.

The grim realities such as the increase in global water demand with approximately 1.9 billion people who accounts for a quarter of the world's population living in acute water scarcity make awareness programs such as SWASH relevant and crucial.

### **BIOTIKOS**

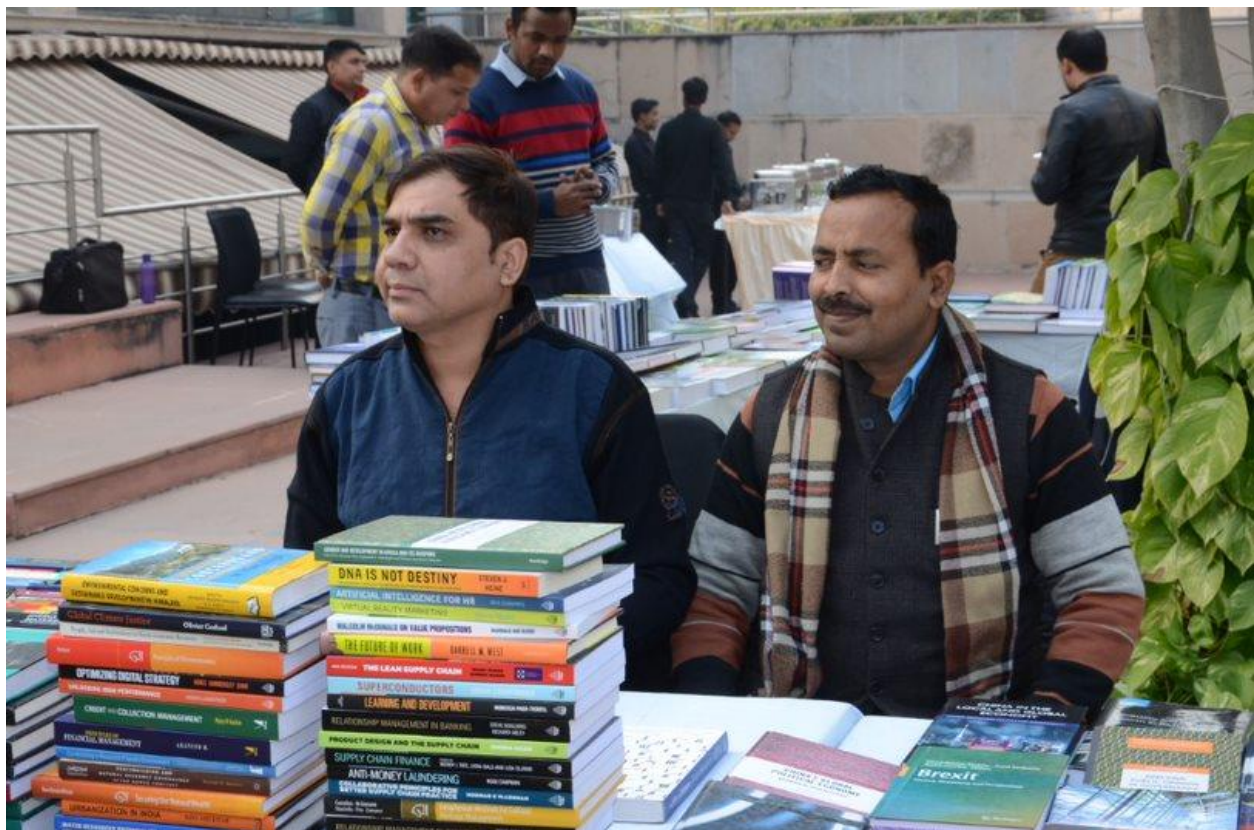
The Greek word "Biotikos" means "matters pertaining to life". Biotikos is an annual biotechnology seminar organized by TERI SAS Biotechnology Society.

This comprises of masters and doctoral level students sharing a commitment of generating awareness about latest breakthroughs and current issues in the field of Biotechnology.

Biotikos was initiated in the year 2011 and then it was inaugurated by Dr. M.S. Swaminathan. Since then this program is organized each year to encourage students to pursue education and research in Biotechnology and contribute to research and development in this fascinating area.

## TERI SAS Library

The Library and its collections and services continue to grow and evolve. It delivered a number of electronic services and an ever-wider range of resources in order to support teaching, learning, and research. The Library continually seeks to identify key areas to add value and develop services that facilitate seamless access to e-resources. It engages in partnership initiatives with academic colleagues and national and international universities. The Library has demonstrated that it is a crucial component of the academic-cum-research environment. It exemplifies modern methods for creating, applying, and utilizing digital resources and services. The services are offered electronically through a web-enabled integrated digital information system. Electronic resources and services are centrally organized and available via a single-window access.



The Library embarks on Institute wide information literacy efforts, targeting everyone from students to faculty. It proactively engages in scholarly interactions with users and makes digital library resources and services more visible, more used, and better attuned to user needs. The digital library literacy classes are integrated into curricula and these are conducted in partnership with faculty in the online learning environment. On-campus dissemination of collections, audio,

and video, archive, and recorded media provide access to digital collections. The digital library system works across locations to create connections among individuals and departments.

The Library customizes digital services for various users, based on their needs, to support expanding modes of research, teaching, and scholarly communication. The tools have web interfaces that allow integrated access to all intellectual content, in-house e-collection, and external digital resources available to the users regardless of format, source, or location. The digital services support specialized teaching needs as well as global and local reach.

Digital library services' development is prioritized according to user needs. The Institute's specific in-house special collections are integrated in online networked services. To facilitate sharing of resources, TERI SAS library familiarizes users with the information available at other university libraries within region, nation, and worldwide. It helps students become more information literate, by conducting subject-specific user-education sessions.



The Library is embedded in departments as well as in instruction and works closely with the students, faculty, PhD scholars, and researchers to meet their needs. It improves their experience of using scholarly resources thus providing innovative, responsive, and effective

services to meet the changing needs of the academic community. In addition to scholarly electronic journals and books, it provide for access to data (economic, corporate, social), news, reports, and analysis to its users. The library is moving towards transition to open access for both journal and monographic materials in ways that result in a more cost-effective system that provides high-quality scholarly content when and where it is needed.



The Library actively engages and connects with the user communities. Helps students to get their work published; supports them to get scholarships, internships, projects, and jobs, thus creates efficiencies for students of each department. Provides help in course readings for all departments and offers convenient access to their assigned readings. It connects into existing course and teaching workflows through the TERI SAS Portal, Digital library e-resources and e-services, and involves in new learning initiatives, like online courses as well as distance learning. To explore some of these newer models, the library continues to build partnerships with diverse cross-section of publishers, from academic to trade, higher education to university presses. The library facilitates learning and education either through direct instruction or online interactions; and train users to use a variety of resources.



While the TERI SAS Library in the campus supports students and faculty through its core services, it also focuses on the student opportunities to help students grow and succeed through national and international events and enables the users to connect and transform their lives.

## IT Infrastructure at TERI SAS

TERI SAS has state-of-the-art IT infrastructure and is equipped with the latest tools and technology. The LAN setup with secure from all internal and external threats. The faculty, staff, and students can access IT infrastructure after successful authentication and authorization. The file services are maintained for storing institute data on a central repository. The smart printing service is enabled for faculty and staff members. Access to multiple resources such as the Internet, Students Information System, Learning Management System, Institute Portal, and Digital Library are made available on all workstations across the Institute.

The campus is fully Wi-Fi enabled, internet link with a capacity of 45 mbps bandwidth. Separate dedicated links are available that connect the campus to access resources such as the Institute Portal, Digital Library, etc. Cloud technology is introduced for mailing through O365, which allows faculties, staff, and students to communicate using mail, audio/video/text chat, group discussion, calendar sharing, and data storing.



The campus has a dedicated computer lab with 20 computers, having various specialized scientific software installed, such as MATLAB, PVSyst, WAsP, etc. The Geoinformatics Lab which comprise of another 20 computers with ARC GIS and ERDAS software is also available for

students. Video conferencing facility for distance learning and a media lab is available for recording and streaming of lectures. Centralized IT Helpdesk staff is present round the clock for addressing IT-related issues in the least possible time. The TERI SAS Portal is an online gateway to information and resources at the Institute. It helps keep students and the faculty informed of happenings across the campus.



The Institute has created and maintained e-learning portals in Moodle platform for online programmes to offer distance education for student across the globe. These course modules are rich in audio and video and have interactive web-based contents.

### Highlights

- All Faculty and Staff systems are using i3 / i5
- Classroom are upgraded on i3 / i5
- Upgraded Projectors in all classroom and lecture hall
- Secure Colour printing service

- Video Conferencing facility for online lecture and meetings
- Cloud technology is introduced for mailing, which allows faculties, staff, and students to communicate using mail, audio/video/text chat, group discussion, calendar sharing, and data storing
- Lease Line upgraded from 20 Mbps to 45 Mbps
- 24X7, NOC support for Wi-Fi
- Archiving usage history logs as per the DOT norms
- Smart Hub for collecting Payment
- Point to point links are available that connect the campus to access resources such as TERI SAS Portal, Digital Library, etc.
- Cyberoam network security service enabled for Anti-Virus, Anti-Spyware & Anti-Spam, Intrusion Prevention System (IPS), Content & Application Filtering, Web Application Firewall, Application Visibility & Control, Bandwidth Management, Multiple Link Management for Load Balancing
- Centralized IT Helpdesk staff is present round the clock for addressing IT-related issues at the earliest possible
- Centralized Symantec endpoint protection for users

### **Media Lab**

A media lab with latest audio and video mixer, high-definition robotic camera, and web-streaming server facility and a video conferencing system is set up at the TERI SAS for providing distance learning and e-learning. The lab allows developing e-content for Institute education at various levels in environmental science courses such as environmental pollution and control, water and wastewater treatment, air quality management, integrated impact assessment, and environmental economics.

The media lab is equipped with a digital glass notebook for live interaction, two high-definition plasma screens for clear picture view, Digital Video Recorder, and 1 Terabyte of storage server for archiving the course material as well as Cisco Telepresence video conferencing system for distance learning. The audio/video editing is done using the Sony VegasPro software.

## Student Portal

The Student Portal of the TERI SAS provides a single point of access to online university services and information of current staff and students.



The portal can be accessed globally. Students can use the following features and services:

Time table

Attendance

Course outline and feedback

Exam result

Placement

Latest news,

events and

announcements

## Open and Distance Learning

The Centre will plan, implement, coordinate and monitor operationalization and quality assurance of the programmes in open and distance learning mode, including monitoring of the conduct and programme delivery by the learner support centres and shall adhere to the regulation and guidelines of UGC and other regulatory authorities.



## Social Presence

Our social presence is on the following sites:

Facebook

<https://www.facebook.com/terischool/>

Twitter

<https://twitter.com/terischool>

Youtube

<https://www.youtube.com/user/teriuniversity>

## Green Campus

TERI SAS has a 'green' campus. It puts into practice the very principles taught in its classrooms. An architectural delight, the campus has been planned to provide a setting that enhances learning, while simultaneously showcasing the concept of modern green buildings. Spread over two acres, the Institute campus comprises an administrative block, an office block, a convergence and hostel block.



The green building has 10 classrooms, each having a capacity for seating 32 students, three lecture halls with a capacity for 60, and an auditorium with a capacity for 100 to 150 persons. The building also has 10 well-equipped laboratories to complement cutting-edge research at the TERI SAS. The campus is aesthetically designed with several features of passive energy-saving design, energy-efficiency, and water and waste management systems.

### Green Features:

- Insulation of external walls

- Insulation on terrace done with vermiculite and puff insulation topped with China mosaic for efficient heat reflection
- Double insulation synergy azure glass is used in external façade with aluminium glazing
- Earth Air Tunnel (EAT), Thermal Mass Storage, and Variable Refrigerant Volume (VRV) systems are used for cooling the building
- Hunter Douglas louvers are used in the building for controlling the intensity of incoming sun rays
- Solar water heating system
- Waste water recycling with STP
- Rainwater harvesting
- Solar Rooftop System
- LED lights across the campus
- Wind mill

## TERI SAS Laboratories (Resources)

TERI SAS harnesses the best of modern technologies to support and encourage the intellectual curiosity of its students and faculty. It also has laboratories with advanced equipment and facilities to aid and stimulate research.

### Solar Lighting Laboratory

TERI SAS has established a Solar Lighting Laboratory (SLL) which is a first-of-its-kind laboratory in India and achieved the NABL's accreditation (National Accreditation Board for Laboratories) as per IEC 62257-9-5 ed. 2.0. The laboratory adheres to International Electrotechnical Commission (IEC), an international body that sets standards for all electrical, electronic and related technologies throughout the world standards for the testing of Solar Lighting Systems (SLS) and also recognized under the Lighting Global programme of International Finance Corporation (IFC). The laboratory is also supported by the Ministry of New and Renewable Energy (MNRE) and has sophisticated equipment and test setup that is used for testing lighting products.



The laboratory's facility is available for testing as per IEC and MNRE specifications for various lighting systems (both solar-based lighting and general lighting). The laboratory has also carried out various training programmes for different target groups. So far, the laboratory has tested

more than 200 models of solar lighting systems including solar lanterns, solar home lighting systems, solar task lights, and multi-purpose solar lights. The ability of the laboratory to cater to the testing needs of both rural as well as urban lighting infrastructure makes it stand out from other laboratories. The laboratory is working towards strong quality assurance and testing programmes which will help in building consumer confidence towards the solar lighting products. The IFC's Lighting Asia-India programme is working with the Institute to achieve these goals.

As a way forward for the development and expansion of this laboratory, it is further planned to be linked with several other groups or programmes that require General Lighting System (GLS) testing. The supreme testing equipment and authority for high quality assurance can lead to the transformation of the laboratory into a nodal agency for General (solar) Lighting System testing not only for India, but entire Southeast Asia.

### **Environmental Monitoring Laboratory**

The Environmental Monitoring laboratory (EML) is capable of providing practical training to the students through structured laboratory curriculum, including all kinds of relevant soil, water, and air monitoring experiments required at the postgraduate level. It caters to the interdisciplinary application in research to all the students of the Institute.

The EML is state of art laboratory equipped with instruments such as UV-Visible Spectrophotometer, GRIMM Aerosol Spectrophotometer, Respirable Dust Sampler, High Volume Sampler, Gaseous Monitoring Kit, Handy Low Volume Air Samplers, Stack Monitoring Kit, PH Meter, Muffle Furnace Ion Selective Electrode, Turbidity Meter, Conductivity Meter, Jar Test Assembly, COD Digester (Reflux), BOD Testing Apparatus, Sensitive Balance, Bomb Calorimeter, Kjeldahl Unit, Microscope (Primostar Halogen), Muffle , TSI Optical Sizer, Potable As Analyzer, Q Track-Indoor Air Quality Monitors And Q Track- Velocicalc.

### **Combustion Laboratory**

The Combustion laboratory has been established to test the performance of cookstoves based on energy efficiency as well as emissions using nationally and internationally accepted protocols such as Water Boiling Test (WBT), Controlled Cooking Test (CCT), and the Indian Standard on Solid Biomass Chulha Specification (BIS India). The hood method is used to capture and quantify the various products of incomplete combustion. The instruments and support facilities that are available in the lab are Moisture Meter, Bomb Calorimeter, Equipment to maintain isokinetic conditions, Aerosol Spectrometer And Dust Monitor, Low Flow Air Samplers (attached with SKC

pump) for collection of bulk aerosols for characterization, Potable Gas Analyzer, Digital Infrared Thermometer

### **Geoinformatics Laboratory**

The Geoinformatics Laboratory at the TERI Institute is well equipped with state-of-the-art equipment such as high-end computers (workstations), scanner, digitizer, printer, navigation devices, Infra-red thermometers and others. It has licensed version of high-end latest commercial software like ERDAS Imagine, LPS, ArcGIS, GMS, and WEAP along with other advanced support system's mechanism. The laboratory is also equipped with web publishing tools like ArcGIS Advance and ArcIMS Servers. The laboratory is also equipped with various open source geospatial software, to expose our students to the powerful open source environment.

The laboratory also holds a good repository of geospatial information in both digital and hard formats.

The Geoinformatics laboratory of the Natural Resources Department of TERI Institute also operates through a network with several research institutions working in the arena of Geoinformatics and other associated fields both within and outside the country.

### **Biotechnology Laboratory**

Biotechnology laboratory is fortified with fundamental and advance facilities required for radical teaching and research applications in plant biotechnology. The laboratory is furnished with autoclave for sterilization, Biosafety Cabinet, Centrifuges, Conductivity Meter, Deep Freezers, Digital pH Meter, Gas Chromatography, Gel Documentation System, Ice Flaking Machine,

Magnetic Stirrer, Microscopy Facilities, Nano-Drop Spectrophotometer, Refrigerated Shaking Incubator, Plant Growth Room, Vortex Shaker with Touch Plate, Water Bath for Incubations, Laminar Air Flow, Master Cycler among other basic infrastructure. Additionally, the Bioinformatics laboratory with work station dedicated computer systems facilitated with advanced software, such as MATLAB, GCK, PAUP, and MacVector exists for 'in- silico' applications.

Further, the plant biotechnology course is augmented by the support from research laboratories involved in research activities led by the faculty members in the areas of Genomics and Plant Development Biology, Nanobiotechnology, Bioinformatics, Microbial genetics and pathogenesis, Stress Physiology and Structural Biology.

## **Power System Laboratory**

The Power System Laboratory gives a comprehensive idea about the practical aspects of power system infrastructure. The generated electrical power is transmitted through transmission lines and used mostly in rotating machines.



The state-of-the-art laboratory infrastructure is equipped with the experimental facilities for providing training on transmission lines, DC machines, induction motors, synchronous machines, and transformers.

The laboratory gives the opportunity for experimental verification of performance characteristics of the power system equipments along with exposure of modern day technologies for solving modern day power system problems. The experiments are designed keeping in mind the multidisciplinary approach of the students coming from different engineering and science backgrounds.

## **Heat Transfer Laboratory**

The Heat Transfer Laboratory is designed to incorporate the practical concepts of heat and mass transfer applied to renewable energy systems and energy conservation techniques. The experiments are designed to give comprehensive knowledge of heat transfer through conduction, natural convection, forced convection and radiation. The laboratory is fully equipped

with experiments on heat exchanger. It also provides knowledge of boiling and condensation processes. The lab explores the basics of mechanical engineering and is designed such that the students are able to acquire interdisciplinary knowledge in an easy way.

### **Energy Simulation Laboratory**

Energy Simulation Laboratory enhances the soft computing skills of the students and enables them for modelling and simulation of energy systems. The laboratory experiments are designed to experimentally verify what they have learnt in the previous laboratories through software applications. The experiments are carried out using renewable energy simulation softwares viz. PVsyst for Solar PV, WAsP for wind, RET Screen for renewable energy project management, HOMER for microgrid applications. MATLAB is also discussed to be used for power flow solutions especially in renewable energy sector.

## SCHOOL-TERI SAS NETWORK

TERI SAS in its endeavour to promote networking with all potential stakeholders including the school children has initiated the School – TERI SAS Network.

This endeavour is built on the understanding that existing school curriculums inadequately cover sustainability related issues in tune with complexities of development. The proposed initiative is aimed at bridging this gap.



The key objectives of this initiative are:

- To provide comprehensive understanding on key sustainability issues
- Offer ways and means to adopt sustainable lifestyles
- Offer different ways to see the world in terms of the goals of sustainable development.
- Be the champions of sustainability-centric development ideas and practices

As part of this network, students from secondary and senior secondary level from schools based in Delhi-NCR are invited to be a part of experiential learning visit to the institute campus. The

sessions are focussed on five broad areas – climate change; energy efficiency; waste management; water management; and urban sustainability. This initiative is driven entirely by the students of the institute and the participating schools.

The participating school selects a batch of 40-50 students to visit TERI SAS for the interactive session on one specific theme as mentioned above. Multiple pedagogical tools (interactions with the trainers, discussion centric deliberations; documentaries, various experiential and visual methods of learning); are used to educate them on the chosen theme.

TERI SAS' Masters Students act as trainers/instructors for the programme. However, the broad guidance is provided by TERI SAS Faculty Members/ Programme Coordinator.