TERI SCHOOL OF ADVANCED STUDIES

PLACEMENT BROCHURE

MSc (Plant Biotechnology) 2018

teri school of advanced studies

Knowledge for Sustainable Development

Deemed to be University under Section 3 of the UGC Act,1956
Accredited with grade 'A' by NAAC

Contents

From the desk of Vice-Chancellor

TERI SAS can proudly say that its alumni are today part of the workforce of several forward-looking, sustainability-oriented corporates, agencies, consultancies, NGOs and even governments at all levels. The University is at the forefront of responding to global concerns on environment and sustainable development through knowledge creation and the development of a workforce that is empowered to guide sustainable economic growth and human well-being.

Building institutional and individual collaborations with like-minded Programmes/ Universities , our faculty ensure that the knowledge we create/imbibe through state-of-the-art research in these areas keeps our learning curriculum cutting-edge, inter-disciplinary and solutions oriented. This curriculum also benefits from a continuous feedback from academic peers at the national and global levels, from the employers of our students and from the students themselves—resulting in refined content and pedagogy on a periodic basis. The presence of international students and interactions with global experts ensures that a student of the TERI SAS is also comfortable in a multicultural setting.

With clearly identifiable areas of domain expertise, our students have the advantage of a systemic appreciation of problem solving needs through engagement with research projects, industry exposure and field visits. We are sure that our students will bring great value to your workforce and you will, while deploying them productively in your organization, give them the opportunity to hone their skills further for the greater global good. We would, of course, at all times value any feedback that you would like to offer us.

Dr Leena Srivastava
Vice-Chancellor
TERI SAS

From the desk of Pro-Vice Chancellor

Academic programmes at the TERI SAS are focused around the challenges of providing for a rising global population with a limited and degraded natural resource base. In moving towards sustainability, the implicit understanding is that there is no panacea or straight road, with recognized and established methodologies, tools or specializations leading to such development. The solutions therefore do not lie in a specific subject discipline, but must be appropriate and relevant to the context or the practical problem being addressed. Developing such an understanding among its students is best achieved through exposure to a variety of subjects, tools, and methodologies offered in interdisciplinary mode. This has been the guiding philosophy behind the programmes offered by the TERI SAS and is practised by building a theoretical understanding in courses covering a variety of traditional disciplines, such as ecology, natural and social sciences, governance, policy, law, and engineering.

At the TERI SAS, students are exposed to a new way of thinking that looks at problems not from the lens of a subject specialist, but from the perspective of one who recognizes the complex linkages between man and his environment.

The TERI SAS's programmes are unique, not only in terms of the degrees, but in terms of the fact that they equip the graduates to lead in a resource-sensitive world. The programmes leverage TERI's knowledge capital in sustainable development to deepen the social and ethical consciousness of higher education in India.

We are sure that you will find graduates of these programmes to be competent leaders with a holistic and long-term perspective for a world that demands new skills and attitude.

Your feedback will be most valuable to us, and we look forward to it.

Dr Rajiv Seth
Pro-Vice Chancellor
TERI SAS

ABOUT TERI School of Advanced Studies

The TERI SAS 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. TERI SAS's academic offering is rooted in the comprehensive research, consultancy, and outreach activities of TERI.

In 1999, the University 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 TERI SAS 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 University 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. The University 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 perspective of the subjects offered and encourage interdisciplinary learning.

Administration

The TERI SAS's Board of Management is responsible for its overall administration and control. All aspects of academic policy are under the purview of the Academic Council, chaired by the Vice Chancellor, which approves curricula, courses, and examination results. Furthermore, it appoints committees to look into specific academic matters arising from time to time.

Structure

TERI SAS has structured its academic programmes around the research experience and skill sets gained by TERI over the past three decades. Since its inception, the wide array of academic programmes offered by the University have been related to sustainable development and structured around four thematic areas—Biotechnology, Regulatory and Policy aspects, Energy and Environment, and Natural Resources. The University is a first-of-its-kind university in India to dedicate itself to the study of environment, energy, and natural sciences for sustainable development.

Department of Natural Resources

Aims to advance and impart knowledge about the environment and natural resources, including their characteristics and dynamics, their economic and societal value, and their management.

Department of Energy and Environment

Aims to advance and impart knowledge in aspects related to clean technologies, renewable energy management, and especially the interface between energy and the environment. Engaged in research in the broad area of clean technologies to achieve energy efficiency and minimize adverse environmental impacts.

Department of Biotechnology

Aims to advance and impart knowledge in the field of life sciences, emphasizing research and the interaction of science with society.

Coca-Cola Department of Regional Water Studies

Aims to advance knowledge and build core competencies among students, researchers, policymakers, and professionals in order to equip them to tackle the interwoven challenges of water sustainability, beyond cultural boundaries and across sectoral divisions.

Department of Business and Sustainability

Aims to provide research-based education that would equip students to implement an integrated approach to business sustainability.

Department of Policy Studies

Aims to achieve a critical mass of expertise and academic excellence that would provide a basis for influencing public policy and regulatory practice.

Centre for Post Graduate Legal Studies

Aims to be an interdisciplinary centre of excellence dedicated to legal research and teaching on issues pertaining to society and development.

Besides a set of core faculty members, the University also draws about 30 PhD qualified research professionals of TERI as adjunct faculty for its programmes. They have rich experience of working on projects related to regulatory studies, policy research, bioresources, biotechnology, energy, and environment.

ACADEMIC PROGRAMMES

At present, the following programmes are offered:

- PhD
- MSc (Environmental Studies and Resource Management)
- MSc (Geoinformatics)
- MSc (Climate Science and Policy)
- MSc (Plant Biotechnology)
- MSc (Economics)
- MSc (Water Science and Governance)
- MA (Public Policy and Sustainable Development)
- MA (Sustainable Development Practice)
- MBA (Infrastructure)
- MBA (Business Sustainability)
- MTech (Renewable Energy Engineering and Management)
- MTech (Urban Development and Management)
- MTech (Water Science and Governance)
- LLM (specialisation in Environment and Natural Resources Law and Infrastructure and Business Law)
- Diploma in Water Science and Governance
- Diploma in Renewable Energy (distance education mode)
- Advanced PG Diploma in Renewable Energy (distance education mode)

The academic programmes offered by the TERI SAS focus on the challenges of providing for the rising global population with a limited and degraded natural resource base. In moving towards sustainability, there is no panacea, or straight road with recognized and established methodologies, tools or specializations. The solutions, therefore, do not lie in a specific subject discipline but must be appropriate and relevant to the context or the practical problem being addressed. Developing such an understanding among the students is best achieved through exposure to a variety of subjects, tools, and methodologies in the interdisciplinary mode. This has been the guiding philosophy of TERI SAS's programmes and is practised by building a theoretical understanding of courses covering a variety of traditional disciplines such as ecology, the natural and social sciences, governance, policy, law, and engineering. Over the duration of their study, students converge upon a few areas based upon their interest, having been exposed to a new way of thinking that looks at problems not from the lens of a subject specialist, but from the perspective of one who recognizes the complex linkages between man and the environment.

The TERI SAS uses modern pedagogical tools, richly supplemented by field visits, live industry projects, and hands-on applications. It provides the best equipment and instruments, which includes state-of-the art computer hardware and software, well-equipped laboratories, video-conferencing facilities, and access to South Asia's most comprehensive library on energy and environment. TERI SAS was awarded the India Today award for the most innovative curriculum. It has also received grade "A" accreditation by National Assessment and Accreditation Council (NAAC).

Collaborations

Stressing the importance of the international perspective in its programmes, TERI SAS has entered into Memorandums of Understanding (MoUs) with several international universities aimed at facilitating a mutually beneficial exchange of students, faculty, knowledge, resources, and ideas.

The University encourages the exchange of ideas, cultural understanding, and a wide range of knowledge that would result from international exposure. In 2007, the University launched an academic exchange programme with Yale University (School of Forestry and Environmental Studies) with support from the V K Rasmussen Foundation. In 2008, the University launched another academic exchange programme with Freie University of Berlin, Germany, with support from DAAD (the German Academic Exchange Service).

TERI SAS has also signed MoUs for academic collaborations with North Carolina State University, University of Eastern Finland, Tor Vergata Economic Foundation (Rome, Italy), Utrecht University (Utrecht, The Netherlands), Carletin University (Canada), Simon Fraser University (Canada), Deakin University (Australia), University of Technology (Sydney).

ACADEMIC CHAIRS AT THE UNIVERSITY

Indian Railways Chair for Sustainable Mobility

The Ministry of Railways, Government of India has set up an Academic Chair on Sustainable Mobility at TERI SAS which serves to bring the most competent academicians/professors from the field of rail infrastructure to lend strength to the ongoing research activities at the University. The Chair involves itself in the issues of rail infrastructure and greening of the railways.

UNESCO Chair

TERI SAS has been granted a UNESCO Chair in Climate Science and Policy. This is a prestigious award and is given to very few universities across the world. The TERI SAS has already tied up with various global universities for being partners in the UNESCO Chair. This includes the Scripps Institute of Oceanography, La Jolla, California, and the Yale Climate and Energy Institute at the Yale University, USA. The Chair serves as a means of facilitating collaboration between high level, internationally recognized researchers and teaching staff of the University and other institutions, particularly in India and other countries in Asia and the Pacific, as well as in Europe and North America.

HUDCO Chair

HUDCO has established an Academic Chair at the TERI SAS with the objective to accelerate research and development, training, and capacity-building in the habitat sector, facilitate capacity-building of urban local bodies, and promote research in the field of urban development and related areas.

INFRASTRUCTURE

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 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 aluminum 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

TERI SAS Laboratories

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 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, SLL 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 University 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 master's level. It caters to the interdisciplinary application in research to all the students of the University.

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 following instruments and support facilities are available in the lab: 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 SAS 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 softwares, 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 SAS 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. We also support research and development activities of the country wide network of The Energy Resources Institute (TERI) branches located across 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 lab 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 Lab 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

Biofuel and Waste Utilization Laboratory

The Biofuel and Waste Utilization Laboratories are distributed between the TERI SAS and TERI Gram at Gual Pahari, Gurgaon. Combustion process and fuel properties such as proximity analysis, COD, etc., are studied at the lab in TERI SAS, while experimental studies on biomass conversion processes such as gasification, biomethanation, and pyrolysis are carried out on facilities at TERI Gram.

TERI SAS Library

The TERI SAS library supports the university's academic and research programmes by meeting the information requirements of students, researchers, and faculty members. Electronic and print resources are available in Natural Resources, Environment, Sustainable Development, Plant Biotechnology, Geoinformatics, Renewable Energy, Infrastructure, Regulations, Public Policy, and related areas.

The Digital Library provides access to electronic books, journals, databases, PhD theses, CDs, links to resources, news, and information alerts about the library. The online bibliography database of the university library can be accessed to search any particular title using the author's name, keyword or title itself. The faculty and students can retrieve online information from the dedicated terminals situated in the library. Network resource sharing facilities are provided through DELNET and interlibrary loan services from the libraries of other universities and institution, such as American Information Centre, Delhi University, Indian Institute of Technology (IIT), Jawaharlal Nehru University (JNU), and more.

Electronic Resources: Theses/ Dissertations (Submitted by the TERI SAS Students), E-journals and Databases: JSTOR/SCIENCE DIRECT /SPRINGER/OPEN ACCESS JOURNALS, E- Books, E-Government Documents and Reference Collection, In-house publications (Newsletters and Journals), Electronic articles and journal content-page alert services are available along with access to holdings of national and international university libraries.

BOARD OF MANAGEMENT

Chairman
Dr Leena Srivastava
Vice-Chancellor, TERI SAS

Members
Dr Rajiv Seth
Pro Vice-Chancellor, TERI SAS

Deans
Dr Prateek Sharma
Dean (Academic), TERI SAS

Dr Arun Kansal
Dean (Research and Relationships), TERI SAS

Three Eminent Academicians Nominated by the Chancellor
Dr Dipankar Gupta
Former Professor in the Centre for the Study of Social Systems, JNU

Dr Ashok Gulati
Infosys Chair Professor for Agriculture, ICRIER

Dr Ashok Khosla
Chairman, Development Alternatives

Nominee of the Government of India
Air Marshal K K Nohwar (Retd)

Nominee of Sponsoring Society
Mr Inder Walia
Former Group Director (HR), Bharti Enterprises

Mr Tulsi R Tanti
Chairman and Managing Director, Suzlon Energy Limited

Ms Anita Arjandas
MD and CEO, Mahindra Lifespace Developers Ltd.

Mr Ishteyaque Amjad
Vice President (Corporate Affairs),Coca Cola India Pvt. Ltd.

Dr Alok Adholeya
Honorary Advisor, Sustainable Agriculture Division, TERI (Co. Opted)

Two Teachers (from Professor and Associate Professor)
Dr Smriti Das
Associate Professor, Department of Policy Studies, TERI SAS

Dr Anandita Singh
Professor, Department of Biotechnology, TERI SAS

One Teacher of the Rank of Assistant Professor
Dr Soumendu Sarkar,
Assistant Professor, Department of Policy Studies, TERI SAS

Controller of Examination
Dr Seema Sangita
Assistant Professor, Department of Policy Studies, TERI SAS

Registrar
Capt Pradeep Kumar Padhy(Retd)
TERI SAS

ACADEMIC COUNCIL

Chairperson of the Council

Dr Leena Srivastava
Vice-Chancellor, TERI SAS

Dr Rajiv Seth
Pro Vice-Chancellor, TERI SAS

Deans

Dr Prateek Sharma
Dean (Academic), TERI SAS

Dr Arun Kansal
Dean (Research and Relationships), TERI SAS

Heads of the Departments

Dr Sapna Narula
Department of Business and Sustainability, TERI SAS

Dr Suresh Jain
Department of Energy and Environment, TERI SAS

Dr Sudipta Chatterjee
Department of Natural Resources, TERI SAS

Dr Chaithanya Madhurantakam
Department of Biotechnology, TERI SAS

Dr Nandan Nawn
Department of Policy Studies, TERI SAS

Mr M V Shiju
Centre for Post Graduate Legal Studies, TERI SAS

Professors

Mr S Sundar
Emeritus Professor, Department of Policy Studies, TERI SAS

Dr Anandita Singh
Professor, Department of Biotechnology, TERI SAS

Associate Professors from Departments

Dr Naqui Anwer
Associate Professor, Department of Energy and Environment, TERI SAS

Assistant Professors from the Department by Rotation of Seniority

Dr Anu Rani Sharma
Assistant Professor, Department of Natural Resources, TERI SAS

Ms Fawzia Tarannum
Lecturer, Department of Regional Water Studies, TERI SAS

Nominees of the Vice Chancellor

Dr Kanchan Chopra
Professor and Former Director, IEG

Dr Malathi Lakshmikumaran
Director, Lakshmikumaran & Sridharan

Dr T C Kandpal
Professor, Centre for Energy Studies, IIT Delhi

Co-opted Members

Dr Anubha Kaushik
Professor and Dean, School of Environment Management, GGSIU

Dr Vivek Suneja
Dean(Planning), FMS, Delhi University

Dr Rakesh Khosa
Professor, Department of Civil Engineering, IIT Delhi

Secretary

Capt Pradeep Kumar Padhy
Registrar, TERI SAS

PROGRAMME OUTLINE: MSc PLANT BIOTECHNOLOGY

The MSc Plant Biotechnology programme at the TERI SAS commenced in 2008. The programme is designed to raise awareness among the students on recent developments in the area of plant biotechnology, cell biology, biochemistry, bioinformatics and their applications in industry, and agriculture. The main focus of this programme is on plant sciences and molecular biology, and to integrate these disciplines to foster the development of strategies achieving plant improvement for food, non-food, and health-related applications. Along with core subjects, such as molecular plant breeding, plant tissue culture, genetic engineering, and molecular cell biology, the students are also trained in applied mathematics, statistics, bioinformatics, and computational biology to enhance their skills to integrate pure science and emerging technologies successfully. By linking biotechnology with computational advances, this programme emphasizes translation in the commercial realm. Students of this programme acquire interdisciplinary expertise around a strong biotechnology core.

PROGRAMME STRUCTURE

Semester	Course	Credits
Semester 1	All compulsory	22
Semester 2	All compulsory	25
Semester 3	All compulsory	22
Semester 4	Major Project	24
Total		**93**

SEMESTER 1

• Plant Biotechnology and Crop Improvement
• Introduction to Sustainable Development
• Technical Writing (Communication Skills and Technical Writing)
• Principles of Genetic Engineering and Recombinant DNA Technology
• Applied Mathematics
• Plant Biotechnology Laboratory - Part 1
• Conceptual Foundations of Molecular Biology
• Concepts in Biochemistry
• Bio-analytical Techniques

SEMESTER 2

- Bioinformatics and Computational Biology - Part I
- Plant Biotechnology Laboratory - Part 2
- Plant Biotechnology Laboratory - Part 2
- Molecular Markers and Breeding
- Statistics for the Life Sciences
- Molecular Plant Physiology and Metabolism
- Molecular Cell Biology - From Genes to Communities

SEMESTER 3

- Bioethics and Public Awareness
- Plant Biotechnology Laboratory - Part 3
- Plant Biotechnology Management and Regulatory Issues
- Genomics and Molecular Genetics
- Multivariate Data Analysis
- Molecular Plant Physiology and Metabolism
- Bioinformatics and Computational Biology – Part 2

SEMESTER 4

- Major Project

INFRASTRUCTURE FOR BIOTECHNOLOGY

MSc Plant Biotechnology aims to advance and impart knowledge in the field of life sciences, emphasizing research and interaction of science with society. The laboratories at the TERI SAS and the parent organization, The Energy and Resources Institute (TERI), provide an intellectually stimulating research environment. The infrastructure and facilities where the research programmes are undertaken are detailed as follows:

Department of Biotechnology (TERI SAS)

- Teaching laboratories—Two
- Research laboratories—Three
- Plant growth room—One
- Plant tissue culture facilities

- Area for biosafety level two — One
- Net-house for transgenic crops (TERI Gram)
- Computer laboratory for bioinformatics—One

Laboratories at the India Habitat Centre and at TERI Gram

- Micropropagation Technology Park, Fermentation Facility
- TERI-Deakin University Nanotechnology Centre at TERI Gram

PROGRAMME OUTCOME

The MSc Programme in Plant Biotechnology at the TERI SAS is unique, comprising intensive hands-on laboratory training along with emphasis on multi-disciplinary education through courses in computational biology, applied mathematics, intellectual property rights (IPR), and bio-ethics. The philosophy and methods followed by the TERI SAS enhance job prospects for students in diverse sectors of biotechnology. It intends to empower students with technical skill-sets and generate capacities and career opportunities in the key domains of biotechnology, viz. research and development, science education and policy, regulations, and management, among others.

OUR FACULTY

Faculty from Department

Dr Ramakrishnan Sitaraman

PhD
(University of Alabama, Birmingham)
Subjects: Microbial Genetics and Pathogenesis

Dr Anandita Singh

PhD
(Jamia Hamdard University, New Delhi)
Subjects: Genetic Engineering and Genomics

Dr Pallavi Somvanshi

PhD
(UP Technical University, Lucknow)
Subjects: Bioinformatics and Computational Biology

Dr Chaithanya Madhurantakam

PhD (Indian Institute of Technology, Kharagpur)
Subjects: Structural Biology and Protein Engineering

Dr Udit Soni
PhD
(Indian Institute of Technology, Delhi)
Subjects: Nanosciences and Nanochemistry

Dr Shashi Bhushan Tripathi
PhD
(Berhampur University, Orissa)
Subject: Environmental Sciences

Faculty from other Department

Dr Prateek Sharma
PhD
(Indian Institute of Technology, Delhi)
Subjects: Statistics for the Life Sciences Advanced Statistics

Dr Neeti
PhD
(Graduate School of Geography, Clarke University)
Subject: Multivariate Data Analysis

Dr Gaurav
PhD
(Aligarh Muslim University)
Subject: Plant biotechnology management and regulatory issues

Guest Faculty

Mr Yateendra Joshi
Senior Fellow (World Institute of Sustainable Energy)
Subjects: Communication Skills and Technical Writing

Dr K P Kochhar
PhD (AIIMS)
Subjects: Bioethics and Public Awareness

Ms IY Bhanu Sree
MSc Mathematics
(Sri Venkateswara University, Tirupati, Andhra Pradesh)
Subject: Applied Mathematics

Dr Mala Narang Reddy
PhD Social Anthropology (University of Delhi)
Subject: Introduction to sustainable development

EVENTS AND ACTIVITIES

-BIOTIKOS

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

BIOTIKOS 2017

'Trends in Nano biotechnology'

28-29 September 2017

TERI SAS Biotechnology Society organized their annual technical event, BIOTIKOS on 28-29 September 2017 in partnership with Department of Biotechnology, Government of India; Monsanto and STM Journals. The event focused on the theme, 'Trends in Nano biotechnology', this year. Biotikos 2017 was being organized by the students and faculty of Department of Biotechnology, TERI SAS, to discuss and debate the promises and challenges of Nanobiotechnology. The proposed event aimed at enlightening science undergraduates/ post-graduate students and teachers about the upcoming areas in Nanobiotechnology and its applications in different scientific fields. Research scholars, academia and students gathered to discuss and deliberate on the upcoming areas in Nano biotechnology and its applications and relevance in different scientific fields to the contemporary imperative of sustainable development.

The event was inaugurated by Dr Manoj Kumar Patairiya, Director of the CSIR-National Institute of Science Communication And Information Resources (CSIR-NISCAIR), New Delhi, along with TERI SAS's Vice-Chancellor Dr Leena Shrivastava and Dr Alok Adholeya, Director, TERI-Deakin Nanobiotechnogy Centre.This event included a series of lectures, panel discussion, quiz and poster presentation across various domains of nano biotechnology such as nanomaterial, nano bioscience, nano medicine, agriculture, environmental nano biotechnology, and more.

Field Visits

TERI SAS aims to encourage the students' exposure to new advancements in the era of biotechnology, theoretically and practically, by visiting the places relevant to the innovations in the field. One of these outdoor activities includes laboratory visit at TERI GRAM- Gurugram and study trips include INST, NIPER at Mohali, CPRI at Shimla & AIIMS New Delhi.

- **CPRI Shimla**

The **Central Potato Research Institute** (CPRI) is an Indian public research center dedicated to potatoes. It is an autonomous agency attached to the Ministry of Agriculture. The CPRI was founded in August 1949, with the aim of developing varieties and techniques adapted to local conditions. In 2002, the CPRI had created 35 new varieties of potato which contributed to the huge expansion of potato cultivation in the country, accompanied by a significant increase in yields.

- **NIPER Mohali**

National Institute of Pharmaceutical Education and Research (NIPER) is the first national level institute in pharmaceutical sciences with a proclaimed objective of becoming a centre of excellence for advanced studies and research in pharmaceutical sciences. The Government of India has declared NIPER as an 'Institute of National Importance'. It is an autonomous body set up under the aegis of Department of Pharmaceuticals, Ministry of Chemicals and Fertilizers, Government of India. The Institute is conceived to provide leadership in pharmaceutical sciences and related areas not only within the country, but also to the countries in South East Asia, South Asia and Africa. NIPER is a member of Association of Indian Universities and Association of Commonwealth Universities.

- **INST Mohali**

Institute of Nano Science and Technology (INST), Mohali (Punjab), an autonomous institution of Department of Science and Technology (DST), Government of India, has been established under the umbrella of NANO MISSION, initiated by DST to boost research and development in the field of Nano science and Nanotechnology in India. NST brings together biologists, chemists, physicists, materials scientists and engineers having interest in nano science and technology. INST scientists, having strengths in basic science together with more application oriented mind from different backgrounds, work together by joining hands as a cohesive unit, under a congenial work environment, on a common platform apart from carrying out their individual research. The aim is to generate processes, technologies and devices directed towards national priorities especially in sectors like Agriculture, defence, healthcare, energy, environment and water.

Students' Profile

ABHIMANYU SINGH

Academic Background :
BSc. (H) Botany

Projects / Trainings :
Basic biotechnology and Bioinformatics Tools, Plant tissue culture lab, Plant molecular biology lab, Bioinformatics lab

ABHISHEK KUMAR DUGAR

Academic Background :
BSc. (H) Botany

Projects / Trainings :
Potential of organic farming in combating salt stress and its socio economic aspects

ANIKET WALIA

Academic Background :
BSc. (H) Botany

Projects / Trainings :
Quantification of heavy metal toxicity in fruits and vegetables cultivating in Delhi/ NCR region and their health issues

APOORVA GUPTA

Academic Background :
BSc. (H) Zoology

Projects / Trainings :
Molecular techniques and field work, Plant tissue culture lab, Plant molecular biology lab, bioinformatics lab

APOORVA TEOTIA

Academic Background :
BSc. (H) Botany

Projects / Trainings :
Technologies - From lab to field, molecular techniques and field work, Plant tissue culture lab, Plant molecular biology lab, bioinformatics lab

ARTI

Academic Background :
BSc. (H) Botany

Projects / Trainings :
Molecular techniques and field work, Plant tissue culture lab, Plant molecular biology lab, bioinformatics lab

DIKSHA TOMER

Academic Background :
BSc. (H) Botany

Projects / Trainings :
Molecular techniques and field work, Plant tissue culture lab, Plant molecular biology lab, bioinformatics lab

KOMAL KUMARI

Academic Background :
BSc.

Projects / Trainings :
Plant tissue culture lab, Plant Molecular Biology lab, bioinformatics lab

PRARTHANA KHURANA

Academic Background :
BSc. (H) Botany

Projects / Trainings :
Plant tissue culture lab, Plant Molecular Biology lab, bioinformatics lab

PRATYASHA BAROOAH

Academic Background :
BSc. (H) Botany

Projects / Trainings :
Plant tissue culture lab, Plant molecular biology lab, bioinformatics lab

PRIYA VAISH

Academic Background :
BSc. (H) Botany
Projects / Trainings :
Plant Tissue culture lab, plant molecular biology lab, bioinformatics lab

PRIYANKA S

Academic Background :
BSc. Biotechnology
Projects / Trainings :
Animal cell culture(HeLa cells), Plant tissue culture lab, Plant Molecular Biology lab, bioinformatics lab

RITIKA JONWAL

Academic Background :
BSc. (H) Botany
Projects / Trainings :
Plant tissue culture lab, Plant Molecular Biology lab, bioinformatics lab

RITU RAHEJA

Academic Background :
BSc. (H) Botany
Projects / Trainings :
Plant tissue culture lab, Plant Molecular Biology lab, bioinformatics lab

SANDHYA YADAV

Academic Background :
BSc. (H) Botany
Projects / Trainings :
Plant tissue culture lab, Plant Molecular Biology lab, bioinformatics lab

SURBHI NAUTIYAL

Academic Background :
BSc. (H) Botany
Projects / Trainings :
Plant tissue culture lab, Plant Molecular Biology lab, bioinformatics lab

SWATI SINGH

Academic Background :
BSc. (H) Botany
Projects / Trainings :
Plant tissue culture lab, Plant Molecular Biology lab, bioinformatics lab

VASUNDHARA SHARMA

Academic Background :
BSc. (H) Botany
Projects / Trainings :
Plant tissue culture lab, Plant Molecular Biology lab, bioinformatics lab

VIJYESH SHARMA

Academic Background :
BSc. (H) Botany

Projects / Trainings :
HSP100/ClpB-C mutants (Hot 1-3) in heat stress in Arabidopsis thaliana

PLACEMENT PROCEDURE AND GUIDELINES FOR RECRUITERS

The campus recruitment activity for MSc (PBT) is conducted to serve dual purposes—placement of the students for their final project which is undertaken in the fourth semester and the formal job recruitment on completion of the programme.

Our placement process consists of two phases:

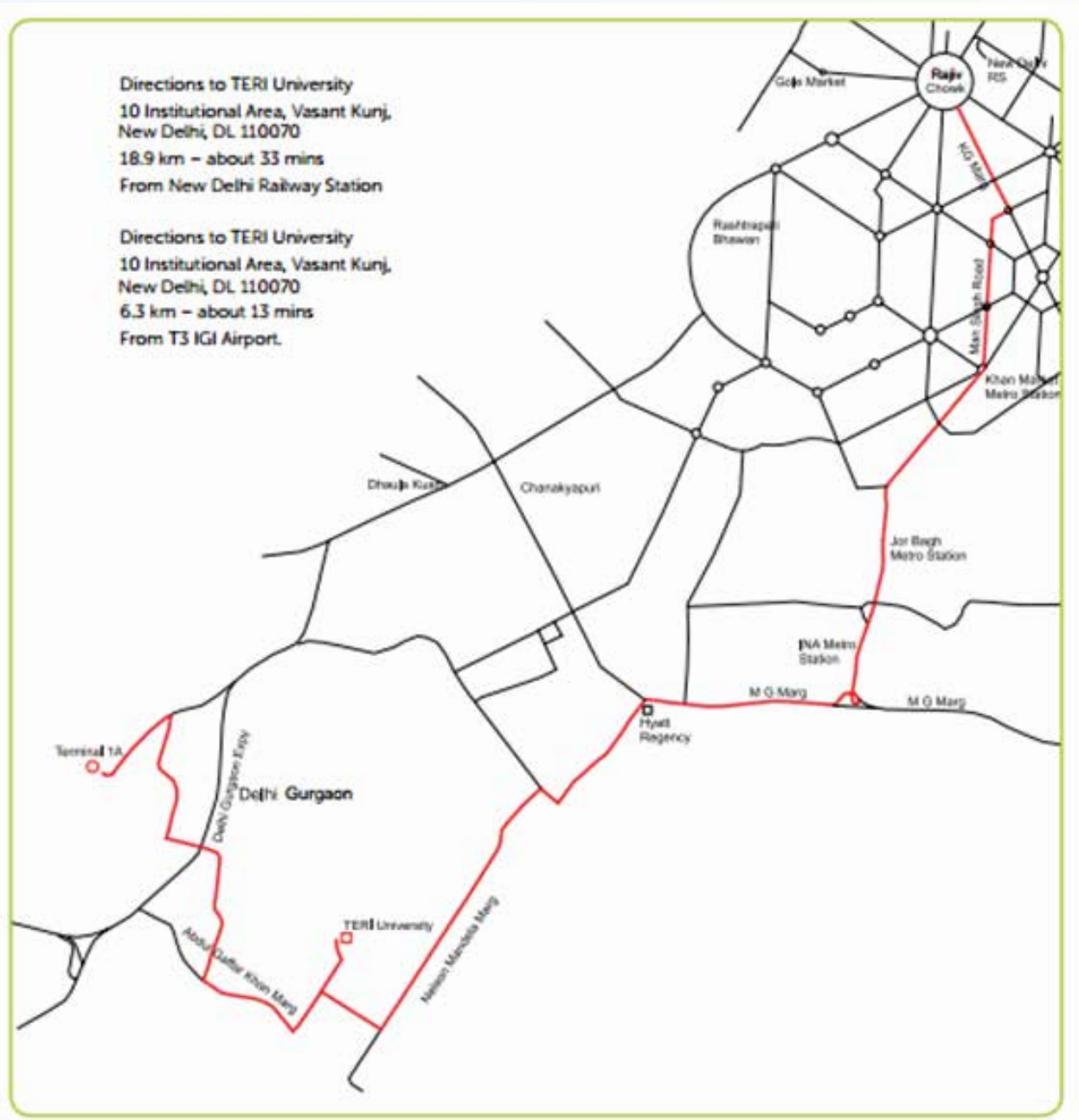
Masters' Thesis Project	
Recruitment Period	Availability of Students
October to December 2017	January to June 2018
Job Placement	
Recruitment Period	Availability of Students
October 2017 to June 2018	June 2018 onwards

We welcome you to visit our campus for interviewing and selecting students for major projects and final placements. You may interact with the students either through telephone, video conference, or in person. Interested organizations may contact the Placement Cell. The contact details are mentioned at the back of the brochure.

Previous employers and organizations for internship

University Putra Malaysia (UPM)	Defence Research & Development Organization, Delhi
Panacea Biotech, Delhi	Jawaharlal Nehru University, New Delhi
Cadila Pharmaceuticals Limited, New Delhi	University of Delhi, Delhi
CSIR-CDRI, Lucknow	Delhi Technological University, Delhi
International Rice Research Institute, Manila, Philippines	Lakshmikumaran and Sridharan Attorneys, Delhi
National Institute for Research in Reproductive Health, Mumbai	Lal, Lahiri and Malhotra, Delhi
International Crop Research Institute for the Semi-Air Tropics (- ICRISAT), Hyderabad	Uttam Group of Institutions, Uttar Pradesh
John Innes Centre, Norwich, UK	Ingenious e-Brain Solutions, Gurgaon
University of Tennessee, USA	The Energy and Resources Institute, New Delhi
Central Institute of Medicinal and Aromatic Plants (CIMAP), Lucknow	Department of Forest and Wildlife, Government of NCT of Delhi
National Botanical Research Institute (NBRI), Lucknow	TERI SAS, New Delhi
IITs (Delhi, Bombay, Kharagpur, Kanpur, Roorkee)	All India Institute of Medical Sciences, New Delhi
Central Bureau of Investigation (CBI), Government of India	Innodata India Pvt.- Ltd
National Institute of Plant and Genetic Resources, Government of India	Translation Health Science & Technical Institute, Faridabad
National Institute of Plant Genome Research, Delhi	YJ Trivedi & Co., Ahmedabad
International Centre for Genetic Engineering and Biotechnology, Delhi	Department of Biotechnology
National Institute of Immunology, Delhi	Effectual Services
Centre for Cellular and Molecular Biology, Hyderabad	University of Hawaii
Institute of Genomics and Integrative Biology, Delhi	Texas Tech University

Map to Reach TERI SAS



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Knowledge for Sustainable Development

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PLACEMENT CELL

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