



#### **Preamble**

Amity University Haryana, located on a 110-acre campus at the foothills of the Aravallis, is committed to promoting sustainability and protecting terrestrial ecosystems in line with SDG 15: Life on Land. The university maintains a lush green campus with over 30,000 plant species, herbal gardens, organic farms and multiple initiatives for sustainable land management. Our practices focus on conserving biodiversity, educating the community, and advancing eco-friendly technologies

#### Introduction to the Goal

A forest is any region of land covered in trees, and it plays a crucial role in the survival of all living beings. Forests are vital for human existence as they provide oxygen, food, shelter, fuel, and livelihood for the tribal communities residing in and around these areas. Forests are home to nearly 80% of all terrestrial species on Earth, serving as a lifeline for countless ecosystems and offering essential resources for nearby human populations. From the timber used for construction to the air we breathe, forests supply us with everything. They represent a self-sustaining system that nurtures a wide variety of life forms. Each forest ecosystem includes biotic (living) and abiotic (non-living) components that work together in harmony.

Forests offer numerous benefits to people. All parts of a tree—leaves, branches, stems, bark, fruits, seeds, and roots—are useful. Forests provide an abundance of resources, including wood, timber, fruits, vegetables, and raw materials, all of which hold substantial economic value. Unfortunately, millions of trees are cut down annually to meet the growing demands of humanity. It is imperative that we take proactive measures to protect forests and expand green cover to support the myriad species that depend on these ecosystems.

Goal 15 of the United Nations' Sustainable Development Goals (SDGs) focuses on ensuring the sustainability of life on Earth by promoting the conservation and sustainable use of terrestrial ecosystems. It aims to combat desertification, prevent and reverse land degradation, halt biodiversity loss, and support the restoration of degraded land and soil. Achieving this goal will ensure that life on Earth can thrive.

### **Current Efforts to Achieve the Goal**

**Plantation Drives:** Organizing large-scale tree planting events to restore and expand green cover.

Water Conservation and Harvesting: Implementing water-saving techniques and constructing water harvesting systems to ensure the sustainable use of water resources.

**Green Campus Initiatives:** Promoting ecofriendly practices within campuses and communities to reduce environmental impact.

**Establishment of Herbal Gardens:** Developing herbal gardens to preserve traditional medicinal plants and promote biodiversity.

**Pollution Control Activities:** Conducting activities aimed at reducing air, water, and soil pollution.

**Reduction of Polythene Usage:** Initiatives to minimize the use of non-biodegradable materials like plastic, which harm the environment.

**Establishment of Biogas Units:** Creating biogas units to utilize organic waste for energy generation and reducing dependency on conventional fuels.

**Organic Farming:** Encouraging sustainable agricultural practices that reduce chemical use and preserve soil health.



Harvesting Solar Energy: Installing solar panels and promoting the use of renewable energy to reduce carbon footprints.

Additionally, the organization is committed to preserving traditional medicine practices and has established the "AYUSH - AMITY Herbal Garden and Medicinal Plants Distribution Centre" in partnership with the Ministry of AYUSH. This herbal garden serves as a valuable resource for cultivating and distributing medicinal plants, thus contributing to biodiversity conservation and sustainable development.

By implementing these initiatives, we are making strides towards achieving Goal 15 and ensuring a sustainable future for all living beings on Earth.

# **15.2 Supporting Land Ecosystems Through Education**

Amity University play a significant role in

educating students, faculty and staff about the importance of ecosystem and biodiversity. The university create awareness about the goal by offering relevant courses, seminars and workshops. It also facilitates research projects related to SDG 15, contributing to the development of new technologies for environment management. It leads by example by implementing sustainable environment management practices on campus. Programs related to Sustainable Development Goal (SDG) 15, which focuses on Life on land are an integral part of the curriculum. The university offers various UG and PG programs to train students and professionals in the field of environment and climate.

**15.2.1** Amity University organizes various events related to land sustainability, conservation and promoting the sustainable use of land. These events involve training, workshops, and seminars that are open to both local and national participants.

S.No	Programes	School/Institute
1	B.Sc. (Hons) - Biological Sciences	Amity institute of Rusiness
2	M. Tech - Biotechnology	Amity institute of Business
3	M Tech – Solar and Alternate Energy	Amity Cabool of Applied Caionese
4	M.Sc -Renewable energy	Amity School of Applied Sciences
5	BSc- Earth Sciences	
6	M.Sc Environmental Sciences & Management	Amity School of Earth and Environmental Sciences



Some of the Open Electives those UG students across the university opts during their studies related to earth sciences, environmental sciences and climate change

#### Climate Science

Semester 1- AST2151- Basics of Climate Science

Semester 2- AST2251- Introduction to Earth System Science

Semester 3- AST2351- Cloud Microphysics and Chemistry

Semester 4- AST2451-Climate Change: Impact, Vulnerability and Adaption

Semester 5- AST2551- Primer of Oceanography

Semester 6- AST2651- Fundamentals of Climate Variability and Modeling

### • Environmental Management

Semester 1- ENV2151- Environmental Studies-I\*

Semester 2- ENV2251- Environmental Studies-II\*

Semester 3- ENV2351-Environmental Pollution and Waste Management

Semester 4- ENV2451-Environmental Management and Industrial Safety

Semester 5- ENV2551-Environmental Economics and Globalization

Semester 6- ENV2651-Sustainable Development Practices

### Geotechnical Engineering

Semester 1-CIV2351- Engineering Geology

Semester 2-CIV2451- Geo informatics

Semester 3-CIV2551- Geotechnical

Engineering-I

Semester 4-CIV2651- Geotechnical

Engineering-II

Semester 5-CIV2751- Project (Geotechnical Engineering)

Semester 6-CIV2851- Seminar-Geotechnical Engineering

- Amity University Haryana organizes various events annually, including Earth Day celebrations and farmer training programs, aimed at promoting the sustainable use of land. These events educate students, faculty and local farmers on best practices for land conservation, biodiversity protection, and sustainable agriculture.
- On Earth Day 2023, Amity University Haryana hosted a seminar on 'Biodiversity Conservation and Land Use Management,' where experts discussed innovative methods to protect native species and ensure sustainable agricultural practices
- Amity School of Earth & Environmental Sciences organized online Poster Competition 2023 on the occasion of International World Environment Day 2023 held on 5th June 2023
- World Environment Day 2022 https://www.amity.edu/gurugram/sdg/sdg 4/sr.no-62-outcome-report-auh-05-juneasees.pdf
- Amity University Haryana Celebrates International Yoga Day 2022 https://www.amity.edu/gurugram/aset/eve nt-detail-normal.aspx?mpgid=926& pgidtrail=939&typeld=2&Eventsld=12189
- Size-separated aerosol chemical characterization over Ny-Ålesund during the Arctic summer of 2010 Research Paper https://doi.org/10.1016/j.scca.2023.100016
- COVID-19 Lock-down in Delhi: Understanding Trends of Particulate Matter in Context of Land-Use Patterns, GIS Mapping, and Meteorological Traits https://www.scopus.com/inward/record.uri ?eid = 2-s2.0-85147329894&doi = 10.1089%2fees.2022.0020&partnerID=40& md5=7f0c83f154dfa94ec51388bc56e64a80



- Research Paper on An Overview of Stratospheric Ozone and Climate Effects DOI: http://dx.doi.org/10.36956/eps.v1i2.782
- Multiresidue analysis and probabilistic dietary risk assessment of 241 pesticides in wheatgrass (Triticum sp.) using LC-MS/MS in combination with QuEChERS extraction https://www.scopus.com/inward/record.uri?eid=2-s2.0-85131156396&doi=10.1002%2fbmc.5411&partnerID=40&md5=8a3260a4737d4d71ed7fd6500e546550
- MTC Herbal Garden Visit: As part of the compulsory 5-day Military Training Camp (MTC) at Amity Universities, students participate in a guided visit to the AYUSH AMITY Herbal Garden. This educational tour introduces them to a variety of medicinal and herbal plants, emphasizing their ecological importance and traditional medicinal uses. The visit aims to raise awareness about biodiversity conservation, sustainable practices, and the value of natural resources in healthcare, aligning with Goal 15's focus on ecosystem education and preservation.





### **Herbal Garden Visit of Students**

Offer educational programme on ecosystem foe local or national communities.

**School Students visit:** School student visit organises by Amity Schools to aware students about the medicinal plants, herbs, and their importance in today's world. AUH Herbal Garden and Dog academy make sure to give them the appropriate knowledge about the Plants and Animals.





**Visits of Guest:** Every visitor to the university, regardless of their employment objective, is given a comprehensive tour of the campus that includes a visit to the dog academy, an organic farm, and a herbal garden to educate them about ecosystem management.







## **DISTINGUISHED SPEAKERS**

### **Dr. Umesh Varshney**

Professor and Dean,
Department of Microbiology & Cell Biology,
J. N. Tata Chair Professor
Indian Institute of Science,
CV Raman Road, Bengaluru, Karnataka 560012

### Dr. V Nagaraja

Professor, IISc Bangalore Chairman, Department of Microbiology & Cell Biology President, Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bangalore, Honorary Professor, AUH

#### Dr. D N Rao

Honorary Professor,
Department of Biochemistry, IISc, Bangalore
Convener, Talent Development Center.
President of SBCI. Indian Institute of Science,
CV Raman Road, Bengaluru, Karnataka 560012

# **Dr. Priyanka Gite**

Professor Banaras Hindu University





Professor Q.C. KANHUKAMWE-Hon'ble Vice Chancellor Harare Institute of Technology, Zimbabwe



### Workshops

The students gained a lot of information about several plant-based food products that are available in market under brand name PLANTMADE, vegan diet, keto diet, Jain kosher meals, nutrition associated with plant-based food, various food allergies, why to choose plant-based food products over animal-based food products, comparison of plant-based food products with animal-based food products in terms of nutrition, digestion, availability, price, ingredients, variety, taste, cooking style, cooking time etc.

Link is attached: https://www.amity.edu/gurugram/events/12403/workshop-on-plant-based-food-products-by-mr.-prakarshi-pulkit,-chief-of-operations-&-innovations-plantmade

- Formulation and Nutritional Evaluation of Gluten Free Cookies Incorporated with Sunflower Seed Flour https://agribiop.com/ formulation-and-nutritional-evaluation-ofgluten-free-cookies-incorporated-withsunflower-seed-flour/
- Environmental Education And Its Policies Implementation In Indian Education System: A Perspective https://doi.org/10.51470/ plantarchives.2023.v23.no2.044

### **Awareness Programs**

• Most of the students are basically from Urban background. For the first time the students are seeing a rural area so closely and interacting with the farmers in their field. This is a big learning in their academic life. Usually, the students like to do secondary data analysis, but this field visit made them to learn how to frame a rural research problem, how to plan a field study, how to prepare a interview schedule, how to conduct an interview etc. The interaction with the farmers was an immense opportunity for them to understand the life of the people who feed India.

- Community Outreach Programme Agricultural Transformation: A Study of Farming Households in Eight Villages of Haryana Organized by Amity School of Economics
- Helps in spreading awareness towards environmental issues and problems associated with it. How can we invest in making or planet a better place to live. https://www.amity.edu/gurugram/ events/12927/amity-school-of-earth-&environmental-sciences-celebrated-earth-day

#### 15.2.2 Sustainably Farmed Food on Campus

- The university practices organic farming across its mango, kinnow, aonla, and citrus gardens. Seasonal fruits and vegetables are grown sustainably on campus and used to provide fresh produce for students and faculty. The farm-to-table initiative reduces the carbon footprint and promotes selfsustained food production.
- **Farm Yard:** Equipped with 1,00 cows, producing 200 liters of milk daily.

### **Organic Farming**

- Organic farming is often considered a sustainable and environmentally friendly agricultural practice that can contribute to land conservation in several ways. Land conservation is essential to maintain soil health, biodiversity, and overall ecosystem stability. Here are some of the ways in which organic farming can promote land conservation:
- **Reduced Soil Erosion:** Organic farming practices, such as crop rotation, cover cropping, and reduced tillage, help to reduce soil erosion. By minimizing soil erosion, the topsoil layer, which is critical for plant growth and soil health, is preserved.
- Enhanced Soil Health: Organic farming relies on the use of compost, manure, and organic matter to improve soil fertility. This



- approach enriches the soil with nutrients and organic matter, promoting soil structure and microbial activity. Healthy soil is better at retaining water, preventing runoff, and supporting long-term land productivity.
- No Synthetic Chemicals: Organic farming avoids the use of synthetic pesticides and fertilizers, which can have adverse effects on soil and water quality. By eliminating these chemicals, organic farming reduces contamination of the land and adjacent water bodies.
- **Biodiversity Conservation:** Organic farming often supports higher levels of biodiversity compared to conventional agriculture. By avoiding synthetic pesticides and promoting diverse crop rotations, organic farms can provide habitats for beneficial insects, birds, and other wildlife. This contributes to land conservation efforts by maintaining healthy ecosystems.

- Preservation of Native Plants and Heirloom Varieties: Organic farming often encourages the cultivation of heirloom and native crop varieties, helping to preserve genetic diversity and traditional farming practices. This is essential for land conservation because it maintains unique and regionally adapted plant species.
- Water Conservation: Organic farming practices, such as mulching and efficient irrigation methods, help conserve water resources. Water conservation is closely linked to land conservation because water is a critical element of soil health and ecosystem stability.
- Reduced Energy Usage: Organic farming often involves more labour-intensive practices but may require fewer energyintensive inputs like synthetic pesticides and fertilizers. By reducing the energy footprint, organic farming contributes to the overall conservation of natural resources.



Name of Inventors	Title	Complete/ Provisional	Date of Submission	Application No.	Patent Published	Status
Luxita Sharma, Dhananjay Sharma, Amity Medical School, AUH, Manesar. E-mail: Lshrama@ggn.amity.edu Ph: 9717296338	A Ficus Religiosa Soup Powder Composition with Protein Isolate and Method Thereof	Provisional	7/15/2022	202211040599	1/19/2024	Published
14181/2022-co/l	A High Fiber Pickle Developed From Ficus Religiosa	Luxita Sharma, Dhananjay Sharma, AUH, Manesar	Registered	L-120840/2023	1/27/2023	1-July22



- Amity Organized webinar on "Optimizing Nutrition for Good Health" by Ms. Shilpa Thakur Chadha, Senior Consultant Dietician, Asian Hospital https://amity.edu/admission/ EventDefault.asp?currentYear=2022&curren tMonth=8#
- Nutrition week celebration https://www.amity.edu/ gurugram/events/12402/amity-college-ofnursing-organized-nutrition-exhibitioncelebrate-the-world-of-flavour
- Millet in your Skillet Competition Organised by Amity https://www.amity.edu/ gurugram/ events/12550/millet-in-your-skilletcompetition-organised-by-department-ofdietetics-and-applied-nutrition
- Amity School of Hospitality organized Millet-O-Mania Competition https://www.amity.edu/ gurugram/events/12930/amity-school-ofhospitality-organized-millet-o-maniacompetition
- The Nutraceutical Role of Pumpkin Seed and its Health Effect: A Review https://impactfactor.org/ PDF/IJPQA/14/IJPQA,Vol14,Issue1,Article40. pdf
- Role of nutrition in minimizing mental and health-related issues during COVID-19: a systematic literature reviewhttps://doi.org/ 10.1108/NFS-12-2022-0421

# 15.2.3 Maintaining and extending current ecosystems' biodiversity

The campus supports biodiversity through maintaining a herbal garden with over 120 plant species and it also preserves both flora and fauna within its boundaries. Additionally, sustainable irrigation practices like sprinkler and drip systems ensure minimal environmental disruption.

#### Medicinal Plants - Herbal Garden

An herb garden is often a dedicated space in a garden, devoted to growing a specific group of plants called herbs or medicinal plants.

On our campus, a 5-acre herbal garden is a rich resource for advanced research in the field of Medicinal Plants. The herbal garden is treated as a field laboratory for creating awareness amongst students and visitors.

Here Herbal Garden is a separate space in garden devoted to growing a specific group of plants known as herbs. In our herbal Garden there is combination of ornamental and medicinal plants which we used for research and demonstration purpose.

It also plays important role in biodiversity conservation, commercial cultivation of medicinal & aromatic plants, production of quality planting material, processing & value addition, education, product development, capacity building, education and consultancy, marketing, database and publications.





Plantation in nearby Villages



- Soil Testing Report Cardhttps://drive.google.com/file/d/1mATosgltV ICrQXI1m-EOZPbrbKT2MqhW/view? usp=drive link
- 29 Mar 2023 | Gurgaon (Manesar) Educational Visit to Medicinal Garden Facility at AUH Organized by Amity Institute of Pharmacy on 29th March 2023 https://www.amity.edu/gurugram/aip/event -detail-normal.aspx?mpgid=1093 &pgidtrail=1094&typeld=2&Eventsld=12941
- Amity School of Earth & Environmental Sciences Celebrated Earth Day https://www.amity.edu/gurugram/events/12 927/amity-school-of-earth-&environmental-sciences-celebrated-earthday
- Research Paper on Effect of Gymnema sylvestre in the Control of Diabetes: A Review https://impactfactor.org/PDF/IJPQA/14/IJP QA,Vol14,Issue1,Article37.pdf
- A Review on nutritional and therapeutic properties of Moringa Oleifera and its future prospects in value addition of food products https://drive.google.com/file/d/1RiQZfwwo z8wg0ZXB1utHlBn\_iPjHrsxQ/view
- Phyto-chemical Analysis and study of antibacterial activity of some selected Medicinal Plants from urban green space of Tricity Chandigarh https://www.eurchembull.com/issue-

- content/phyto-chemical-analysis-andstudy-of-antibacterial-activity-of-someselected-medicinal-plants-from-urbangreen-space-of-tricity-chandigarh-11756
- Indo-Danish Workshop on Agro-Forestry & Hydroponics Organized by Amity https://www.amity.edu/gurugram/events/12 560/indo-danish-workshop-on-agroforestry-&-hydroponics-organized-byamity-school-of-earth-and-environmentalsciences-

## 15.2.4 Educational programs on ecosystems

Amity University provides educational outreach for the local community, focusing on ecosystems and biodiversity. Free educational programs and workshops are held on campus, encouraging participation from the broader community.



Name of Inventors	Title	Complete/ Provisional	Date of Submission	Application No.	Patent Published	Status
Rupali Sharma, Satish Sardana, Arun Mittal, AIP, AUH, Manesar. E-mail: rsharma9@ggn.amity.edu	A Novel Casein Phosphopeptide Amorphous Calcium Phosphate (CPP-ACP) and Stevia Rebaudiana Self Nanoemulsifying Drug Delivery System (SNEDDS) Based Oral Care Gel Formulation'	Provisional	8/22/2022	202211047699	2/23/2024	Published







- Workshop- Scientist of KRISHI VIGYAN KENDRA GURUGRAM
- Signing the Memorandum of Understanding Organized by Amity Skills Institute on 02nd August 2022 https://amity.edu/ admission/EventDefault.asp?currentYear=20 22&currentMonth=8#
- Guest lecture on 'Health Perspective of Particulate Matter: Measurements and Modelling' https://www.amity.edu/ gurugram/events/12357/guest-lecture-on-%E2%80%98health-perspective-ofparticulate-matter:-measurements-andmodelling%E2%80%99
- Amity University Gurugram organized session on Science and Technology for S u s t a i n a b l e D e v e l o p m e n t https://www.amity.edu/gurugram/asl/eventd e t a i l - n o r m a l . a s p x ? m p g i d = 1329&pgidtrail=1330&typeld=2&Eventsld= 12926
- Awareness Week on Waste Management"
   Organized by Chem Club of CBFS, Amity

- School of Applied Sciences from 14 to 20 November 2022https://www.amity.edu/gurugram/events/12762/%E2%80%9Cawar eness-week-on-waste-management% E2%80%9D-organized-by-chem-club-of-cbfs,-amity-school-of-applied-sciences-from-14-to-20-november-2022
- Community Outreach Programme Agricultural Transformation: A Study of Farming Households in Eight Villages of Haryana Organized by Amity https://www.amity.edu/gurugram/events/1 2609/community-outreach-programmeagricultural-transformation:-a-study-offarming-households-in-eight-villages-ofharyana-organized-by-amity-school-ofeconomics-

## Vermicompost

Vermicompost is indeed beneficial for the conservation of land and soil for several reasons:

**Soil Erosion Control:** Vermicompost improves soil structure, making it more resistant to erosion. It helps bind soil particles together, reducing the risk of soil erosion caused by wind and water.

Increased Soil Fertility: Vermicompost is rich in organic matter and essential nutrients. When added to soil, it enhances its fertility, providing plants with the necessary nutrients for healthy growth. This can lead to increased crop yields and better plant resistance to diseases and pests.

**Enhanced Water Retention:** Vermicompost improves the soil's water-holding capacity by increasing its ability to retain moisture. This is particularly beneficial in arid regions, as it helps conserve water and reduces the need for frequent irrigation.

**Reduced Soil Degradation:** The use of vermicompost can help mitigate soil degradation caused by continuous agricultural practices. It replenishes essential nutrients and



organic matter in the soil, preventing nutrient depletion and maintaining soil health.

**Decreased Soil Pollution:** Vermicomposting is an eco-friendly method of managing organic waste. By diverting kitchen scraps and other organic materials from landfills, it reduces the risk of soil pollution caused by harmful substances leaching from landfills into the soil.

**Minimal Chemical Dependency:** The nutrientrich vermicompost reduces the reliance on synthetic chemical fertilizers, which can harm the soil and surrounding ecosystems over time. This is especially important for sustainable agriculture and land conservation.

**Soil Microbial Activity:** Vermicompost contains beneficial microorganisms that promote healthy soil microbial activity. These microorganisms can break down organic matter further and aid in nutrient cycling, leading to improved soil health.

**Enhanced Biodiversity:** Healthy soil, supported by vermicompost, can sustain a diverse range of soil organisms, including earthworms, beneficial insects, and microorganisms. This biodiversity contributes to the overall health of the ecosystem.

**Sustainable Land Use:** Vermicompost is a sustainable and renewable resource that supports long-term land conservation efforts. It can be produced locally, reducing the need to transport soil amendments over long distances.

By improving soil quality, reducing the need for synthetic inputs, and supporting sustainable agricultural and gardening practices, vermicompost contributes to the conservation of land and helps ensure that it remains productive for future generations. It is an ecofriendly solution to many of the challenges associated with land degradation and soil depletion.











- Multi-Sensor Measurements of Rural Air Quality During Diwali 2022 https://www.amity.edu/gurugram/events/12 534/multi-sensor-measurements-of-rural-air-quality-during-diwali-2022
- Faculty Development Programme on Innovative Methods, Skills and Eco-Friendly Technologies https://www.aiu.ac.in/ documents/research/Amity%20Univ%20Re ports%20for%20AIU%20Website/Amity%20 Univ/Amity-AU%20-%20Programme% 201%20Brief%20Report.pdf
- Guest Lecture on "Light and its Interaction with Airborne Particles How We Measure Air Pollution in Philippine Cities" Organized by Amity Center of Excellence in Ocean-Atmospheric Science and Technology on February 7th, 2023 https://www.amity.edu/gurugram/events/12717/guest-lecture-on-%E2%80%9Clight-and-its-interaction-with-airborne-particles--how-we-measure-air-pollution-in-philippine-cities%E2%80%9D-organized-by-amity-center-of-excellence-in-ocean-atmospheric-science-and-technology-on-february-7th,-2023

# 15.2.5 Sustainable management of land for agriculture

The university actively engages in educational outreach for sustainable land management. Programs are offered to local communities to spread knowledge on maintaining agricultural land sustainably.





- Omics in Biomethanation and Environmental Remediation Book Chapter https://doi.org/ 10.1002/9781119852131.ch2
- Environmental Issues and their Possible Solutions for Sustainable Development India: A Review http://dx.doi.org/10.12944/ CWE.17.3.3
- Role of carbon-dioxide sequestering bacteria for clean air environment and prospective production of biomaterials: A sustainable approach https://pubmed.ncbi.nlm.nih.gov/ 35304714/
- Semi-Decadal Spatio-temporal variation of gaseous pollutants over a Part of a National Capital Region, India
- Biochemical effects of three personal care products on growth and development in Cicer arietinum (chickpea) and Vigna a c o n i t i f o l i a (m o t h b e a n) https://www.scopus.com/inward/record.uri? eid=2-s2.0-85129136957&doi= 10.1016%2 fj.biteb.2022.101051&partnerID=40&md5=f add1a14fe75b8f5a2af9666cf463ad8

# **15.2.6 Sustainable management of land for tourism**

**Educational Outreach for Sustainable Agriculture:** Offering educational outreach programs focused on sustainable land management for agriculture is essential for promoting environmentally friendly farming practices. These programs can target local



farmers, agricultural students, and community members. Similar outreach programs are available for promoting sustainable tourism.

Sustainable management of land for agriculture and tourism is crucial to ensure the long-term well-being of both the environment and the economy. Here are some key principles and practices for achieving this balance:

Land-Use Planning: AUH Develop comprehensive land-use plans that consider the needs of both agriculture and tourism. These plans should consider factors such as soil quality, water resources, and ecological sensitivity.





**Crop and Livestock Rotation:** AUH implement crop and livestock rotation to maintain soil health and fertility, reduce the need for synthetic fertilizers and pesticides, and prevent soil erosion.

**Agroforestry:** AUH Integrate tree and forest systems into agricultural landscapes to provide multiple benefits, such as carbon sequestration, habitat for wildlife, and potential tourism opportunities like agro-tourism or forest-based tourism.







Name of Inventors	Title	Complete/ Provisional	Date of Submission	Application No.	Patent Published	Status
Naveen BP, Thakur Ramjiram Singh (NIISTS, Bhopal), ASET, AUH, Manesar. E-mail: bpnaveen@ggn.amity.edu, Ph: 9916232349	A Novel Composition for Sustainable Cow Dung Bricks with Enhanced Porocity, Strength and Method Thereof'		9/21/2022	202211054025	3/22/2024	Published



- Research Paper "Satellite and Model Observations of the Impact of Dust and Biomass Burning On Air Quality over a Pristine Location" https://doi.org/10.36266/ IJGRS/103
- Research Paper on Polar Integrating Nephelometer Inversion of Air Quality over a Rural Station in North-west India https://doi.org/10.36266/IJGRS/101

# **15.3 Supporting Land Ecosystems through Action**

Amity University has implemented policies focusing on the sustainable use of land. These policies include the use of biogas units, composting systems, and organic farming techniques to conserve the ecosystem.

# 15.3.1 Sustainable use, conservation and restoration of land (policy)

Amity University Haryana follows a robust policy for the conservation and restoration of its land. The university plants over 1,000 trees annually, maintains green spaces, and utilizes farmyard manure and vermicompost for soil enrichment. In addition, the biogas unit and solar panels contribute to renewable energy solutions on campus.

The Amity School of Earth & Environment Sciences (ASSES), in collaboration with the Horticulture Department, organized a plantation drive on 5th September 2022 at the AUH Campus. The drive, held at Gate No. 2, was inaugurated by Hon'ble Vice Chancellor Professor (Dr.) P.B. Sharma and Pro-Vice Chancellor Prof. (Dr.) Vikas Madhukar.

Plantation Drive on 5th September 2022

Location: Gate No. 2, Amity University Haryana

Campus

Time: 11:30 AM - 12:00 PM

The reforestation of native plant species to restore biodiversity and combat climate change. The plantation drive focused on planting around 1,000 saplings, all of which were native species, ensuring easier adaptation to the local environment.

- Native Plants: All plants used were native species, contributing to the campus's existing biodiversity.
- Ecological Impact: The AUH campus, with its natural vegetation patches, supports a healthy ecosystem, evidenced by the significant presence of birds and butterflies.
- Climate Change Mitigation: The initiative emphasized that deforestation is responsible for 18-25% of climate change, and planting trees is crucial to stabilizing the environment.





**Plantation Drive 2022** https://www.amity.edu/gurugram/sdg/sdg15/ 15.2.1-plantation-drive.pdf



**Biogas Plant:** In all spheres of socioeconomic and agro-industrial growth, a far larger focus on green energy technologies, green science, and green engineering would be necessary in the post-COVID-19 future. A green and bright future for the people of India and the global society is guaranteed by this significant transition towards green technologies. With the blessing of solar energy from the sky and a vast amount of biological green waste from its

agriculture, India has a ripe chance to accelerate the adoption of green energy technologies. India has achieved remarkable success in solar energy, but its commitment to producing and using biogas has increased much too much. Biogas generation from the country's biowaste produced in plenty.

Hence, Amity university Haryana inaugurated its biogas powered Bio Lamp.











Name of Inventors	Title	Complete/ Provisional	Date of Submission	Application No.	Patent Published	Status
Hon'ble Founder President Dr. Ashok K. Chauhan, Dr. P. B. Sharma, Dr. Indu Shekhar, Dr. Shalini Bhaskar Bajaj, Dr. Manoj Kumar Pandey and Dr. W. Selvamurthy AUH, Gurgaon campus E-mail: pbsharma@ggn.amity.edu, sbbajaj@ggn.amity.edu	A System for Saccharification, Gasification and Upgradation of Lignocellulose Waste for Production of Green Energy	Provisional	6/30/2022	202211037786	1/5/2024	Published
Hon'ble Founder President Dr. Ashok K. Chauhan, Dr. P. B. Sharma, Dr. Sanjeev Sharma, Dr. Shalini Bhaskar Bajaj, and Dr. W. Selvamurthy, AUH, Gurgaon campus, E-mail: ssharma26@ggn.amity.edu, Ph: +91 9412257300	An Electrode-based Green Coal Bed Gasifier System	Provisional	7/7/2022	202211038879	1/12/2024	Published
Preeti Thakur, Atul Thakur, Abhilash Pathania, ASAS, AUH, Manesar. E-mail: athakur1@ggn.amity.edu	A Solar Air Dryer Assembly	Provisional	10/12/2022	202211058228	4/19/2024	Published
Abhilash Pathania, Preeti Thakur, Atul Thakur, ASAS, AUH, Manesar. E-mail: apathania@ggn.amity.edu, athakur1@ggn.amity.edu	A Double Chamber Solar Air Dryer with Solar Collector Assembly	Provisional	11/9/2022	202211063953		Not Published

 Book Chapter. Chapter 4: Multi-Year Measurements of Black Carbon Aerosols and Solar Radiation over Himadri, Ny-Alesund https://bookshelf.vitalsource.com/#/

## **Greenery at Campus**

In University the total land area is 110 acres from this only 36 acre is taken by buildings or

infrastructure rest 74 acre is green area which includes Trees, shrubs and Lawns and playground. Mostly multipurpose trees are planted along the side of he roads, which gives Aesthetic feel, shadow and they are fast growing, native so easy to maintain like Alstonia, Shisham, Neem, Peepal Ficus, Sagwan, Poplar Indian Mahogany, Frangipani, Pilkhan etc.



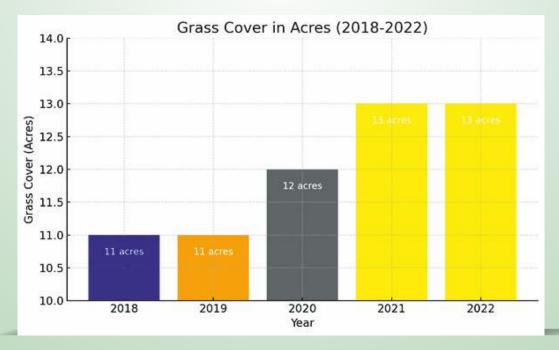






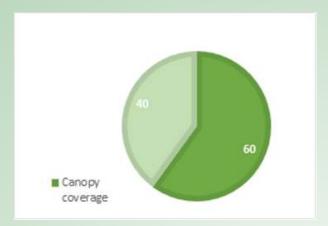


The green cover consists of trees and grass cover around the university which are 60% of trees and 40% of grass cover as represented on below figure.



This graph represents that in 2018,2019 we were having 11 acre (44515.4 sq.m), 2021 having 12 acre (48562.3 sq. m) and in 2021and 2022 having 13 acre (52609.1 sq. m) of grass cover .





In August and September 2022, Amity University Haryana planted 1,200 native trees around the campus as part of its reforestation project, aimed at enhancing local biodiversity and improving air quality.

# 15.3.2 Monitoring IUCN and Other Conservation Species

- The campus does not interfere with any endangered species and continuously monitors its land to ensure compliance with international and national conservation guidelines
- The university actively monitors biodiversity on its campus, particularly species listed by the International Union for Conservation of Nature (IUCN). The campus is home to numerous birds, plants, and insects that contribute to the region's biodiversity, supported by initiatives such as the Herbal Garden and regular campus biodiversity audits.

### **Rich in Flora and Fauna**

Rich in Flora and Fauna Amity campus in Aravalli hills records 71 species of birds as reported by The Hindu. https://www.thehindu.com/news/cities/Delhi/amity-campus-in-aravalli-hills-records-71- species-of-birds/article22926869.ece There are 49 different species of butterfly in Gurgaon region in which 40 is in AUH.







Different species of butter ies at AUH, https://ebird.org/hotspot/L5441195







- A Bird Habitat as university is having Natural Vegetation, Water Environment, Pollution Free, Open space, Fruit, and Nut Plantation
- Regular Survey & Documentation: 57
- Birds Diversity: 139 Species
- Campus Bird Count (most diverse in NCR)
- 2017-53 Species
- 2018-71 Species
- 2019-83 Species
- 2020- 97 Species
- Diverse Avifauna
- Native/Migratory (Summer/Winter)
- · Waterfowl/Herons/Shorebirds
- Pigeons/Doves/Cuckoos/Barbets
- Bird of Pray/Owls/Crows/Hornbills
- Mynas/Wagtail/Flycatchers
- Babblers/Parrots/Shirkes/Drongo
- Unique Birds
- · Indian Pitta, Small Minivet, Knob billed duck
- Spotted Owlet, Red Avadavat, Peafowl





# 15.3.3 Local biodiversity included in planning and development

In all new construction projects, Amity ensures that local biodiversity is accounted for. Planning processes incorporate sustainable practices, reducing impact on the environment.

#### **LEED Lab**

Three academic buildings on the Amity University Haryana Campus have received certification as LEED PLATINUM for their green building design, operation, and maintenance. This is the highest rating granted by the USGBC (U.S. Green Building Council) for LEED (Leadership in Energy and Environmental Design) in July 2017; the buildings are among the most educational in Asia and India.

The LEED is the most widely used third party verification for green buildings incorporating highest levels of green parameters in use of materials, construction technology, use of natural light but are also operated and maintained with highest standards of energy efficiency. LEED is a framework to provide a life cycle of building from construction to operation by connecting our daily activities to the impacts they have on our planet. It also provides an opportunity to transform the built environment to green building.

Amity University has joined hand with GBCI to train and educate students to cater the



upcoming industry need of green building by initiating an educational module; LEED Lab. LEED Lab is a unique academic initiative which integrates a policy framework to classroom activity to get desired outcome in arena of sustainable built environment. The university has decided to start a LEED Lab for this noble cause of ensuring sustainability. It is a key educational tool connecting students' passion for sustainability with their academic pursuits. It will help to equip the next generation of

sustainability advocates with the practical experience needed to differentiate them in today's job market. Through this program students will be trained for green building framework through classroom activity along with project on existing building of AUH campus and their monitoring and assessment of existing building provide performance score of said building. At the end of the course students will be prepared to take the exams of LEED Green Associate and LEED Accredited Professional.









Diary No.	Title	Name	Status	Registration No.	ROC Date	Filing date
15545/2022-CO/L	Methodology for manufacturing of novel fly ash bricks with concrete waste debris and self-healing bacteria	Naveen B.P. , Anil Soharu and Arjun Sil,	Registered	L-131059/2023	7/28/2023	19-Jul-22



 Educational Visit to District Town Planning Office Gurugram https://www.amity.edu/ gurugram/events/12469/amity-school-ofarchitecture-and-planning-organisededucation-visit-to-district-town-planningoffice-gurugram-under-industry-connectand-student-enrichment

# 15.3.4 Alien species impact reduction (policies)

Measures are in place to control and reduce the impact of invasive species on the campus. This includes awareness campaigns and policies to protect local ecosystems.

AUH build by considering the fact in notice that is without the plants and biodiversity we can't survive on a longer-term basis.

We have a Banyan tree which is approx. 200 years old. We planned buildings in a way that it doesn't affect any existing ecosystem.







Plantation of Local Plant

# 15.3.5 Collaboration for shared land ecosystems

Amity University collaborates with the local community to maintain shared land and ecosystems. Through joint training programs, the university helps local farmers and the community enhance land use and biodiversity protection.







- 24X7 Event "GAON KA MELA" Organized by A mity https://www.amity.edu/ gurugram/events/12509/24x7-event-%E2%80%9Cgaon-ka-mela%E2%80%9Dorganized-by-amity-law-school
- Workshop on Entrepreneurship Opportunities for Rural Women Organized by Amity Skills Institute and Yunus Social Business Centre https://www.amity.edu/ gurugram/events/12481/workshop-onentrepreneurship-opportunities-for-ruralwomen-organized-by-amity-skills-instituteand-yunus-social-business-centre
- Sand dunes morphology and migration in Shyok Valley, Ladakh Himalaya, India Book Chapter https://www.scopus.com/ inward/record.uri?eid = 2-s2.0-85147959105&partnerID=40&md5=bc8bfe 2b4fd77a608d9544bf371b85a7

## 15.4 Land-Sensitive Waste Disposal

# 15.4.1 Water Discharge Guidelines and Standards

- Amity University Haryana has installed a state-of-the-art Sewage Treatment Plant (STP) to ensure that treated water is used for irrigating the campus gardens. Drip and sprinkler irrigation methods further promote water conservation.
- The university adheres to strict water discharge standards to protect the ecosystem. Water from the campus is treated and reused for irrigation purposes in the herbal and vegetable gardens.
- Waste disposal in AUH handled with sensitivity and responsibility to minimize environmental impact and promote sustainability. Land-sensitive waste disposal practices are essential for university to contribute positively to their local ecosystems and communities. Here are some steps AUH take for responsible waste disposal:

- Waste Segregation: AUH Implement a robust waste segregation system on campus. Provide clearly marked bins for different types of waste, such as recyclables, organic waste, and non-recyclables. Education and awareness programs help students and staff understand the importance of proper segregation.
- Composting: AUH Establishing composting facilities for organic waste, including food scraps, yard waste, and other compostable materials. The resulting compost can be used for campus landscaping or community gardens.
- Reuse Programs: AUH Encourage the reuse of items such as textbooks, office supplies, and furniture. This not only reduces waste but also saves money for both the university and students.
- Green Purchasing: When the university purchases goods and equipment, prioritize environmentally friendly
- Sustainability Committees: AUH Form sustainability committees involving students, faculty, and staff to drive waste reduction initiatives and promote environmentally responsible behaviour.
- Environmental Impact Assessments: When planning new construction or infrastructure projects, conduct environmental impact assessments to evaluate the potential effects on local ecosystems and take measures to mitigate them.
- **Heart shaped bin:** In the campus heart shaped bin is established to aware students more about the environment cleanliness.









Pump Room



Oxidation Pond

- Amity University Haryana now has two operating sewage treatment plants (STP) and two operational effluent treatment plants.
- STP Testing Report. https://drive.google.com/ file/d/1r5DYya7g5SrPYLC2zhnmYbdITTkHV gHK/view?usp=drive\_link
- Industrial Visit Botil Oil Tools India Pvt. Ltd Organized By Amity Business School on 1st September 2022 https://www.amity.edu/ gurugram/abs/event-detail-normal.aspx? mpgid=140&pgidtrail=141&typeld=2&Eve ntsld=12692

- Screening and characterization of bioflocculant isolated from thermotolerant Bacillus sp. ISTVK1 and its application in wastewater treatmenthttps://www.scopus.com/inward/r ecord.uri?eid=2-s2.0-85152483856 &doi=10.1016%2fj.eti.2023.103135&partner ID=40&md5=46698a7d4a7de14e29b706d0 bbf76061
- Utilization of Burkholderia sp. ISTR5 for enhanced saccharification and fermentation of agricultural waste for production and upgradation of biogas by calcite-based biocomposite materials https://www.scopus.com/ inward/record.uri?eid=2-s2.0-85170217468 &doi=10.1016%2fj.biteb.2023.101608&part nerID=40&md5=af170e8df571f6943f6e380 7168ff09a

## **Preventing Water System Pollution**



- Ecological Significance of River Ecosystems-Book Chapter
- Challenges and Management Strategies https://doi.org/10.1016/C2020-0-02111-0
- Research Paper on Geochemical characteristics and suspended sediments dynamics in the meltwater from the Gangotri Glacier, Garhwal Himalaya, India. DOI: 10.1007/s12665-023-10802-9
- Solid waste landfill sites for the mitigation of greenhouse gases Book Chapter10.1016/ B978-0-12-823500-3.00010-8



Name of Inventors	Title	Complete/ Provisional	Date of Submission	Application No.	Patent Published	Status
Preeti Thakur, Atul Thakur, Dinesh Kumar, P. B. Sharma, AINT, AUH, Manesar. E-mail: athakur1@ggn.amity.edu.	An Alkaline Water Cell Portable Device	Provisional	6/9/2022	202211033072	1/5/2024	Published
Shashi Bhushan Gupta, Hardial Singh, Sujit kumar, ASET, AUH, Manesar. E-mail: sbgupta@ggn.amity.edu	A Noiseless Silencer Assembly By Using Active Method of Control of Noise	Provisional	7/14/2022	202211040391	1/19/2024	Published





Water Irrigation System

 Water Testing Report- https://drive.google.com/ file/d/1EliANrKV\_UZSCAJcvXUukto2BN\_rGy Wh/view?usp=drive\_link

Centre of Excellence for Innovation in Education, Amity University Haryana, Gurugram celebrated

# **Preventing Water System Pollution**





'World Water Day-2023' on "Water the Elixir of Life: Save it. Held on 22nd March 2023https://www.amity.edu/gurugram/asap/event-detail-normal.aspx?mpgid= 597&pgidtrail=598&typeld=2&EventsId=13041



Name of Inventors	Title	Complete/ Provisional	Date of Submission	Application No.	Patent Published	Status
Viveak Ballyan, Priya Bameta, Arun Kumar Sharma, Ashish Kumar, Gunjan Sharma (DPSRU, Delhi), Bishal Gupta, Jijivisha, Priyanka Bisht, Shristi Srivastav, Jitennder Singh, Yash Kumar, Nirmala Kumari Yadav (IGU, Meerpur), AIP, AUH, Manesar. E-mail: akumar21@ggn.amity.edu, Ph: 9953270069	A Water Purification Assembly Using Foot Movementa Height and Inclination Adjustable Multi-leaf Table Assembly	Provisional	9/30/2022	202211056279	4/5/2024	Published

#### FREE DRINKING WATER PROVIDED

Amity University makes a special effort to provide students, staff, and visitors with free access to safe, clean drinking water. On the university campus, there are 48 water coolers spread between the dorms, academic blocks (A, B, C, and D), AIMC, and other sites. The specifics of where the water coolers are located are given as proof.

# RAINWATER HARVESTING STRUCTURE AND UTILIZATION IN THE CAMPUS

Amity University Haryana is situated in a semiarid area with no transient water sources, so rainwater is the only source of water that is available here for groundwater recharge, which is the university's primary source of water. Since the university's inception, rainwater harvesting facilities, which are comprised of a complex network of rainwater harvesting wells dispersed throughout the campus, have been an essential part of its development plan. The watershed contour of this area is used to determine the size and location of the water harvesting infrastructure, ensuring maximum rainwater harvest.

# MAINTENANCE OF WATER HARVESTING STRUCTURE BEFORE RAINY SEASON

Through the following methods, the university works to promote water efficiency and sustainability:

- Encourage water-saving techniques among all University stakeholders.
- Maintain a close eye on and reduce the university's water usage.
- Native plants are planted to conserve water.
- Encourages the planting of native trees near and around the university to save water.
- Evaluates potential locations on campus where alternative water systems could be installed on a regular basis.
- Continue using cutting-edge water-saving technologies like rainwater collection, water reusing, etc.

Awareness Programs: Workshop on 'Circular Economy & Zero Waste Campus Program' Organized by Amity Centre of Excellence for Innovation in Education In collaboration with 3R and SDG Choupal on 22nd November 2022



"Awareness Week on Waste Management" Organized by Chem Club of CBFS, Amity School of Applied Sciences from 14 to 20 Nov. 2022.

### 15.4.2 Policy on Plastic Waste Reduction

- The campus follows a strict plastic waste reduction policy, focusing on reducing singleuse plastics and promoting recycling. A plant distribution center provides free plants to the local community, further promoting environmental stewardship.
- Amity has policies aimed at reducing plastic waste on campus. There are designated recycling bins, and single-use plastic is discouraged in all campus activities.











Name of Inventors	Title	Complete/ Provisional	Date of Submission	Application No.	Patent Published	Status
Viveak Ballyan, Arun Kumar Sharma, Ashish Kumar, Gunjan Sharma (DPSRU, Delhi), Bishal Gupta, Priyanka Bisht, Srishti Srivastav, Jitennder Singh, Yash Kumar, Nirmala Kumari Yadav (Indira Gandhi University, Meerpur, Rewari), Vinod Kumar (School of Health Science, Sushant University, Haryana), AUH, Manesar. E-mail: akumar21@ggn.amity.edu	An Air Purifying Curtain Assembly and Working Method Thereof	Provisional	2/10/2023	202311008897		Not Published
16462/2022-CO/L	Design Prototype for Automated Segregation of Inorganic Solid Waste Components	Naveen.B. P and Mohammed Yassen	, ,	22		Filed



- Workshop on "Recycling of Waste Products Organized by Amity Institute of Design. https://amity.edu/admission/EventDefault.a sp?currentYear=2022&currentMonth=9#
- Workshop on "Recycling of Waste Products Organized by Amity https://www.amity.edu/ gurugram/events/12504/workshop-on-%E2%80%9Crecycling-of-waste-productsorganized-by-amity-institute-of-design
- Amity School of Earth & Environmental Sciences organized online Poster Competition 2023 on the occasion of International World Environment Day 2023 held on 5th June 2023
- Research Paper on Reclamation and characterization of value-added products from pulp and paper mill effluent using microbial fuel cell https://www.scopus.com/inward/record.uri?eid=2-s2.0-85150069288&doi=10.1016%2fj.matpr.2023.02.415&partnerID=40&md5=ce18aaa538f423084ec54ee7c0108d22
- Research On Multisite Scenarios of Black Carbon and Biomass Burning Aerosol Characteristics in India https://doi.org/10.4209/ aaqr.220435

### 15.4.3 Policy on hazardous waste disposal

The university follows government-mandated guidelines for the disposal of hazardous materials. These include proper storage, treatment and safe disposal processes to avoid environmental contamination.

#### Policies.

# 15.3.1 Sustainable use, conservation, and restoration of land (policy) 22:

Yes

policy on conservation, restoration and sustainable use of terrestrial ecosystems.pdf (amity.edu)

# 15.3.2 Monitoring IUCN and other conservation species (policies) 22

Yes

policy on iucn red listed species.pdf (amity.edu)

# 15.3.4: Alien species impact reduction (policies)

Yes

policy to reduce the impact of alien species.pdf (amity.edu)

# 15.4.2 Policy on plastic waste reduction year: 22

Yes.

policy on reducing plastic waste.pdf (amity.edu) 15.4.3 Policy on reducing plastic waste disposal. policy on waste disposal covering hazardous materials.pdf (amity.edu)

**Awareness Programme:** 18 November 2022 | Gurgaon (Manesar)

Society Outreach Program or Awareness Program on Breast Cancer Organized by Amity College of Nursing, Amity University Haryana, Gurugram on 18th November 2022.





Workshop on Fundamental Clinical Aid and Campus Cleanliness Drive Organized by Amity College of Nursing in Collaboration with Dean Students Welfare Department and Youth Red Cross Society

Date: 9/27/2022

Amity College of Nursing in collaboration with Dean Students Welfare Department and Youth Red Cross, Amity University Haryana organized a workshop on Fundamental Clinical Aid and Campus Cleanliness Drive on 27th September 2022. The keynote lecturers for the session were Ms. Pooja Saharan, Nursing Officer cum Educator, Ministry of Health and Family Welfare, and Mr. Pawan Kumar, Nursing Officer, GTB Hospital, New Delhi.

Without around 166 students and 18 faculty members on board, the session's pivotal points of discussion and outlines included Bio Medical Waste Management, Dog Bite and Snake Bite, Bandaging, Insight into CPR and Burns, Fundamental Clinical Aid Demonstration Camp, Ear and Eye checkup by Optometry department, Fire Fighting Demonstration, and Campus Cleanliness Drive.

Nursing is defined as caring for a patient who is unable to care for themselves, or nursing is an act of providing care to an ill or injured person in an emergency situation in order to prevent further harm to that person, but everyone should have a basic understanding of emergency situations and important first aid care in order to take prompt action to save the lives of their loved ones, and everyone should take responsibility for keeping the environment clean.

The event was held as part of an attempt to raise awareness about First Aid activities in emergency situations and to urge students to participate in a cleaning campaign. Speakers shared their perspectives on First Aid and Priority Actions in an Emergency Situation in a Hospital and Community Area by listening to experts and attending the demonstration Camp Participants received good ideas and were motivated to keep the environment clean during the Campus Cleanliness Drive.



Workshop on Fundamental Clinical Aid and Campus Cleanliness Drive Organized by Amity College of Nursing in Collaboration with Dean Students Welfare Department and Youth Red Cross Society



Workshop on Fundamental Clinical Aid and Campus Cleanliness Drive Organized by Amity College of Nursing in Collaboration with Dean Students Welfare Department and Youth Red Cross Society

https://amity.edu/admission/EventDefault.asp?currentYear=2022&currentMonth=9#

https://amity.edu/admission/EventDefault.asp?currentYear=2022&currentMonth=9#





Amity University, Amity Education Valley, Gurugram, Manesar Helpline: 7303 399 399 | admissions@ggn.amity.edu | amity.edu/gurugram