



HINDUSTAN

INSTITUTE OF TECHNOLOGY & SCIENCE
(DEEMED TO BE UNIVERSITY)

REPORT ON SUSTAINABLE DEVELOPMENT GOALS



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Report on Clean Energy

Centre for Clean Energy and Nano convergence (CENCON)

About Centre : The Centre for Clean Energy and Nano Convergence Centre (CENCON) was established in collaboration with Quantum – Functional Semiconductor Research Centre (QSRC) of Dongguk University with an objective to promote basic and applied research. **The centre was inaugurated by His Excellency, Dr. A. P. J. Abdul Kalam, former President of India on 6th January 2011.** The center aims to work towards clean energy solutions incorporating the quintessence of Nanotechnology. CENCON is one of the members of the international Consortium on nanotechnology along with KTH Sweden and Dongguk University South Korea. The Centre strives to contribute to the Nation’s growing need for sustainable energy. As the name goes, an environmental friendly green technology has been developed for the fabrication of nanomaterial and the same is being explored for various energy applications.

The Centre has collaboration with international institute like KTH Sweden, Uppsala University, Sweden, Dongguk University, South Korea, University of Queensland, Australia and national expertise from IIT Mumbai, IIT Madras and Anna University Chennai. The Centre is capable of predicting modulated properties of various functionalized nanomaterial. The Centre is accomplished with synthesis and characterization of Nanomaterial for various applications like Lithium ion batteries, solar cells, luminescent device, sensors and visible range photocatalysts.

Conferences/Seminar/Workshops conducted (including Co-ordinator with fund allocated) / funding agency

Name of the Conference / Seminar/ Workshops
National Workshop on Energy Nano Convergence-2012 , (5-6 th Jan 2012)
International Conference on Materials for Energy Nano Convergence (ICMENC -2013) –3-6 th July

2013
Indo-Sweden Clean Energy Symposium & Inauguration of High Performance Computing Facility at Hindustan University, held on 21 – 22 nd July 15
HITS – Dongguk University Joint Symposium on 21 st March 2016
International Symposium on “Recent Advances in Nanomaterials” 20 th February 2017
Workshops on “Modeling and Simulations of Nanomaterials using VASP” and “Synthesis and Characterization of Nanomaterials” held on 20 -21 st Feb 2017
Workshop on “Synthesis & Characterization of Materials for Solar cell Applications, 9 th April 2018
The International Symposium on “The Smart Future with Innovation in Materials” and workshop on Chemical Vapour Deposition technique held on 30 th October 2018

Funded Project details (From the commencement of Centre): 4

Sl. No	Year of Sanction	Title of Project	Funding Agency	Amount Received	Current status of Project
1	2013	Enhancement of Photovoltaic efficiency by down conversion phosphors for underwater Solar panels towards Navel applications	NRB, DRDO	24,46,280	Completed April 2018
2	2017	Development of a Photoelectrochemical Cell (PEC) using Si based (In)GaN Nanowires for Hydrogen production by Splitting of Water under Visible Light	NPDF, SERB	18,70,000	Completed September 2018
3	2018	Edge Saturated Si ₂ BN Nano-ribbon As High – Capacity Anode Materials For Next	TARE, SERB	18,30,000	On going

		Generation Mg-ion Batteries			
4	2019	Sn integrated 3D, porous carbon based scaffolds as high capacity anode for Sodium-ion batteries	TARE, SERB	18,30,000	Started

Guest lectures Organized related to theme

1. Plastics and its impact on environment

Date : 7-09-2018

Resource Person: **Dr.Deepak Samuel**, Scientist D, Ministry of Environment, Forest and Climatic change, Anna University Campus, Chennai

The lecture mainly focused on the negative impacts of plastics on the environment. The adversity of plastic bags on marine upon ingestion by marine animals and the environmental hazards on burning, recycling and landfilling of plastics was addressed. In addition, the need for creating public awareness on the importance of a healthy environment was also emphasized.



2. Bioremediation

Date : 31-08-2018

Resource Person: Dr. Elizabeth Rani Julieuss, Head, Department of Biotechnology, Hindustan College of Arts and Science, Chennai

The speaker elaborated the in-situ, ex-situ and microbial bioremediation processes. The process of using micro-organisms to remove the contamination from waste in order to clean up environmental problems like oil spill or contaminated ground water was discussed. The importance of bioremediation and the ongoing research in this emerging field was also emphasized in the lecture.



3. Student's competitions organized

The poster presentation and painting competition for students was conducted on 5 th Sep 2018. Students from first year B. Tech registered for the event and four members are selected for the final round. The topic for the poster presentation was "Plastics and its Impacts on the Environment".

The winners of the events are given below.

Painting competition

1st prize: Ms. G. Sruthi Chowdari (18121152) ECE

2nd prize: Mr. M. Sasidhar (18121153) ECE

Poster presentation

1st prize: Ms. P. Jennifer (18132049) IT

2nd prize: Mr. M. Sai Charan (18117012) EEE

As part of the Science Meet, Department of Chemistry conducted Model Making competition on the theme "**Advancements in science and technology for cleaner environment**" for I year B. tech students on 16th September 2019.

The winners of the competition were awarded the prizes during the Science Meet.

FIRST PRIZE



Mr. Danush Datthathireyan (19103016)
Mr. A. Bharath Kumar (19103029)

SECOND PRIZE



Mr. Shushrit Deepak Jadhav (19103088)
Mr. Sandeep Dutta (19103070)

Electives offered related to theme

Sub Code	Subject Name	Regulation	Description
CYF252	Waste to energy conversion technology	2015	The course emphasizes on the chemical and biochemical processes for converting waste to energy for cleaner environment

CYF352	Industrial Pollution Prevention and Control	2015	This course describes the types of industrial pollutants and methods adopted to minimize and prevent the release of the pollutants into the environment.
CYF351	Bio refineries	2015	This course provides knowledge on the biofuels, bioenergy, processing of biodiesel and the current and future EU regulations.
CYD4293	Alternate fuels	2018	This course imparts knowledge on the various alternate fuels employed in CI and SI engines to control the automotive exhaust emissions

Publication details (2018-19)

1. Comprehensive study on the effect of CuO Nano fluid prepared by one step chemical synthesis method on the behaviour of waste cooking oil biodiesel in CI engine. S.Induja, Journal of Thermal Science and Engineering Applications, August 2019.
2. Particulate matter in stack emissions, generated by various fuels- a comparative study. S.Sumathi, Eco. Env. & Cons.25 (2):2019 Comprehensive study
3. Calcium-boro-phosphates supported NiO catalyst for enhanced oxidation of carbon monoxide and hydrocarbons, B.Gajalakshmi, S.Induja, P.S.Raghavan, Rasayan Journal of Chemistry, April 2018.

Hydrogen production- 3 papers

- Growth of gallium nitride nanowires on sapphire and silicon by chemical vapor deposition for water splitting applications, Applied Surface Science, 2018
- Photocatalytic hydrogen production using bench – scale trapezoidal photocatalytic reactor- International journal of hydrogen Energy, 2019
- Performance Square and Trapezoital Photoreactors for Solar Hydrogen Recovery from Various Industrial Sulphide Wastewater using CNT/Ce³⁺ doped TiO₂- International journal of hydrogen Energy, 2019

Hydrogen storage – 7 papers

- Remarkable Improvement in Hydrogen Storage Capacities of Two-dimensional Carbon Nitride (g-C₃N₄) Nanosheets Under Selected Transition Metal Doping- International journal of hydrogen Energy
- Light Metal Decorated Graphdiyne (GDY) Nanosheets for Reversible Hydrogen Storage, Nanotechnology Vol. 29, No.35, (2018) **Nanotechnology**,
- Enriching the Hydrogen Storage Capacity of Carbon Nanotube Doped with Polyolithiated Molecules, **Appl Surf Sci** (2018).
- Manipulating energy storage characteristics of ultrathin boron carbide monolayer under varied scandium doping. **RSC Adv.** 7, 8598–8605, 2017, doi: 10.1039/C6RA24890J.
- Hydrogen storage properties of light metal adatoms (Li, Na) decorated fluorographene monolayer. **Nanotechnology** 06, 26 (27), 275401, 2015, doi:10.1088/0957-4484/26/27/275401.

Energy storage papers – 12

- Designing strategies to tune reduction potential of organic molecules for sustainable high capacity battery application. **J. Mater. Chem. A**, 5, 4430–4454, 2017, doi: 10.1039/C6TA09760J.
- Assessing the electrochemical properties of polypyridine and polythiophene for prospective applications in sustainable organic batteries. **Phys. Chem. Chem. Phys.** 19, 3307–3314, 2017.
- Enhanced electrochemical performance of nanopyramid-like LiMnPO₄/C cathode for lithium-ion batteries, **Applied Surface Science**, 495,143541.
- Li and Mn-rich Li₄Mn₅O₁₂–Li₂MnO₃ composite cathode for next generation lithium-ion batteries, **Journal of Energy storage**, Vol 24, 100754.
- Electrospun 3D CNF–SiO₂ fabricated using non-biodegradable silica gel as prospective anode for lithium-ion batteries, **Ionics**.
- g-C₃N₄ doped MnS as high performance electrode material for supercapacitor application, Vol. 246, 88-91, **Materials Letters**.
- Spherical LiZnBO₃: Structural, Optical and Electrochemical Properties, **Material Science for Energy Technologies** 2, 267-271(2019).
- Enhanced Electrochemical Performance of LiCoBO₃ Cathode Material for Next Generation Lithium-ion batteries. **Applied Surface Science**, 449, 421-425
LiMn_{0.5}Co_{0.5}BO₃ Solid Solution: Towards High Performance Cathode Material for Next generation Lithium-ion battery. **International Journal of Hydrogen Energy**, 43, 4108 - 4111.
- Enhanced Electrochemical Performance of LiMnBO₃ with Conductive glassy phase: A prospective Cathode Material for Lithium-ion Battery, **Ionics**, 23: 1645–1653
- Electrochemical performance of Sol-gel derived Hexagonal LiMnBO₃ cathode material for Lithium-ion Batteries, **Nano Hybrids and Composites**, 17, 106 -112 (2017),
Synthesis and Morphological Influence on High Capacity LiMnBO₃ Cathode Material for New Generation Lithium Ion Batteries, **ECS Transactions**, 62: 123 – 128(2014).

Solar cell -1 paper

- Enhanced near IR downconversion luminescence in Eu³⁺-Yb³⁺ co-doped V activated ZnO host: An effort towards efficiency enhancement in Si-Solar cells, Materials Letters 249 (2019) 9–12- D.Padma sheeba

Clean water

- Study of optical and electrical property of NaI-doped PPy thin film with excellent photocatalytic property at visible light- polymer bulletin.
- Efficient Adsorption Characteristics of Pristine and Silver-Doped Graphene Oxide Towards Contaminants: A Potential Membrane Material for Water Purification. ChemPhysChem 19 (17), 2250-2257.

CO₂ reduction and Adsorption Paper

- Adsorption mechanism of graphene-like ZnO monolayer towards CO₂ molecules: enhanced CO₂ capture - **Nanotechnology** 27, 015502, 2016, doi:10.1088/0957-4484/27/1/015502.
- Tuning electronic and optical properties of TiO₂ with Pt/Ag doping to a prospective photocatalyst: a first principles DFT study. Materials Research Express

REPORT ON
CLEAN WATER AND SANITATION

WATER CONSUMPTION PER PERSON

Volume of Water used in the University: Total

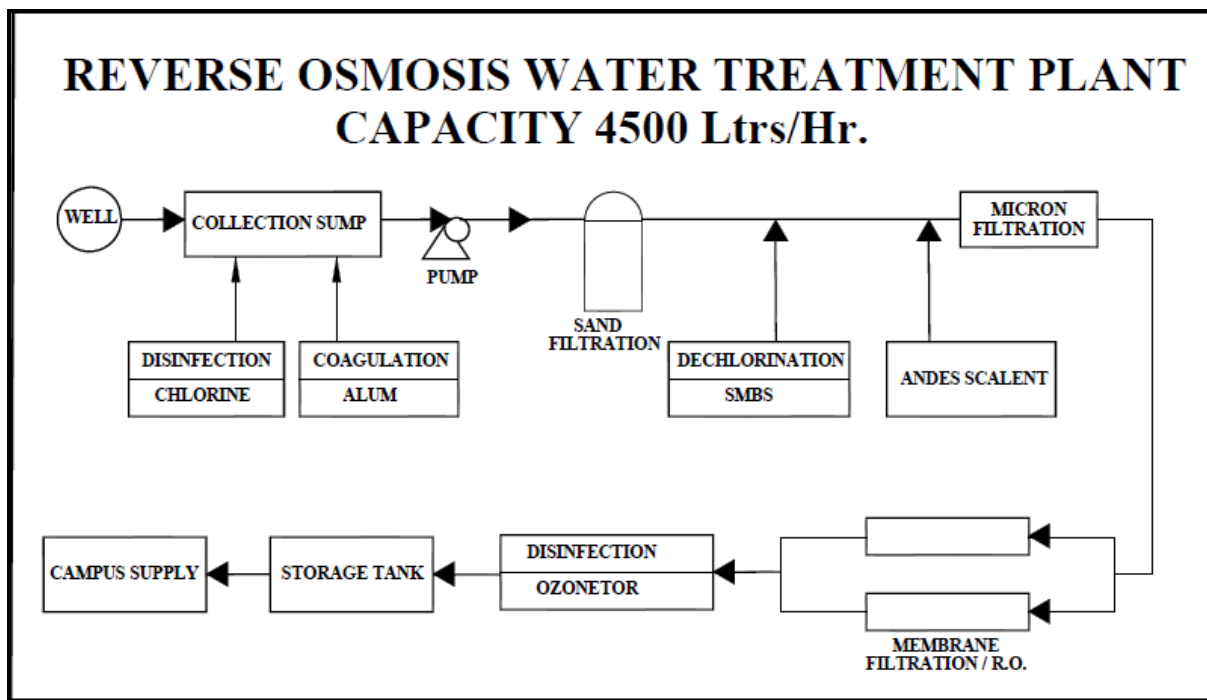
The total number of students at HITS including UG and PG	: 4800
The total number of staffs working at HITS including Teaching and non-teaching faculties	: 1000
The total number of students staying in hostel	: 1000
The total number of day scholars at HITS campus	: $4800+1000-1000 = 4800$
The total amount of water consumed by the day scholars (Considering 10L of water percapita demand)	: $4,800 \times 10 = 48,000$ L/day
The total amount of water consumed by the Hostellers (Considering 150L of water percapita demand)	: $1000 \times 150 = 150,000$ L/day
The total amount of water consumed at HITS	: $150,000+48,000 = \mathbf{198\ KLD}$

Volume of water Used in the University: Inbound (Treated / Extracted Water)

Water which is needed for the entire community of the HITS was taken directly from the Wells, which is located within the campus. The well water is taken directly to the RO plant and advance water treatment is given to the water which includes Disinfection, Filtration, membrane filtration, Micro - filtration and the hardness removal.

The capacity of RO plant is about 4500 litres per Hour and is been operated 8 times in a day

Total volume of treated water used at HITS campus was about $4500 * 8 = 40$ KLD



FLOW CHART FOR THE RO PROCESS

Volume of water used in the university, collected from Rain Water

In view of non-availability of Municipal Water connection and diminishing Ground Water Table to dangerous level, necessary measures are incorporated to collect Rain water to recharge existing wells and a water pond/lake inside the campus. Nearly 6 wells are located within our campus and out of this 5 wells were exclusively serves as a principal source of water supply for the entire campus. All rain water are taken to these wells through various storm conduits and the surface recharge for the wells been carried out. All wells are of about 35 feet depth and 20 feet in diameter.

Almost Entire water usage of about 198KLD was totally depends on the Wells located Within the campus.



Volume of water used in University: reused / recycled Water

Hits campus population almost produces about 120 KLD of waste water mainly from hostels and canteens. For treating the generated wastewater, HITS has designed its own “Sewage treatment plant” and started functioning efficiently in the campus which is of capacity 150 KLD. Basically the wastewater which is generated from the various parts of the campus is collected and taken to the STP plant through conduits, where advanced biological treatment is given to the wastewater. The treated water is re-used for gardening and the agricultural activities throughout the campus, which makes our campus a clean and green environment.

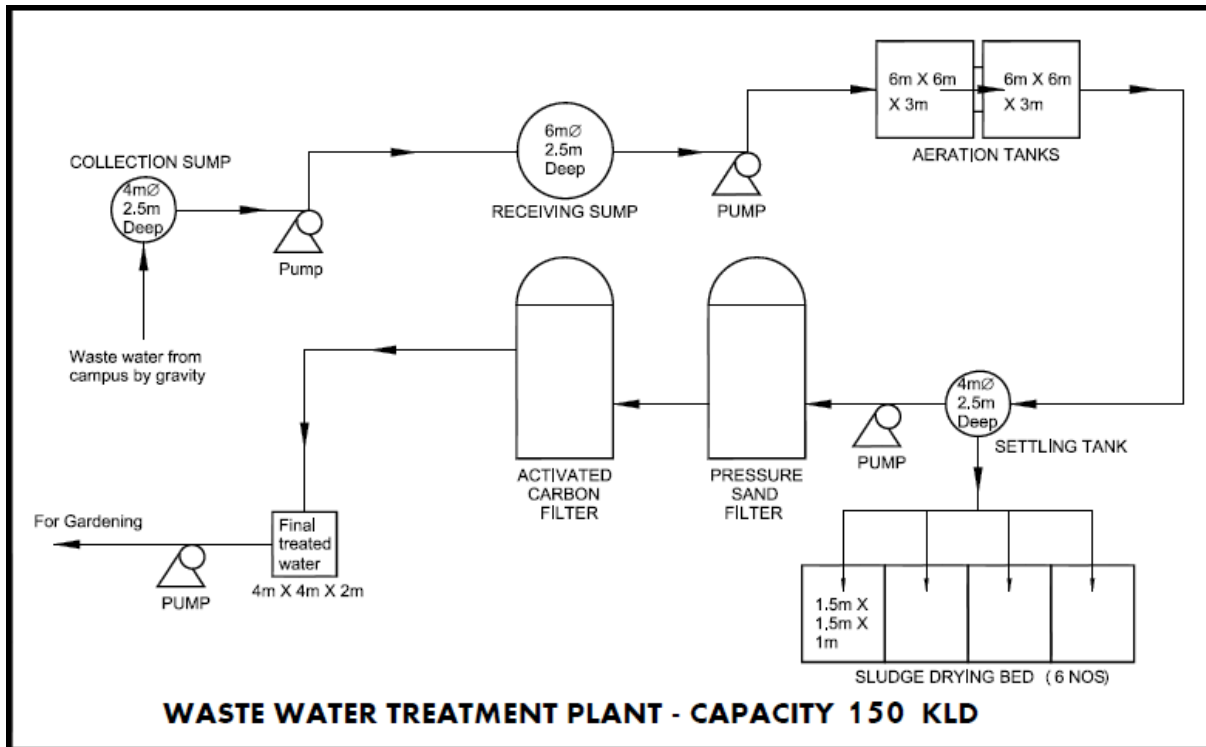


RECYCLED WATER USED FOR GARDENING ACTIVITIES

WATER USAGE AND CARE

Does your University as a body have a process in place to treat Waste Water: YES

For treating the generated wastewater, HITS has designed its own “Sewage treatment plant” of capacity 150 KLD. The wastewater which is generated from the various parts of the campus is collected and taken to the STP plant through conduits, and advance biological treatment is given. The treated waste water is used for the flushing as well as the gardening activities.





RECEIVING SUMP



AERATION TANK



CLARIFIER TANK



ACTIVATED CARBON FILTER



PRESSURE SAND FILTR



Does your University as a body have a processes to prevent polluted water entering the water system, Including the pollution caused by accidents and incidents at the University?.

- YES

In connection with prevention of pollutants entering the water source, all the wells are protected with proper mesh, so that the unwanted entry of debris in to the wells are prevented.



WELLS PROVIDED WITH MESH TO PREVENT THE DEBRIS ENTRY

Free drinking water for students, staffs and visitors:

4 Drinking water fountains is been operated with in the Campus to fulfil the drinking needs of the Campus Population and the visitors.

WATER REUSE

Volume of water used in the University: Total

190 KLD

Volume of water used in the University: Reused / Recycled Water

150 KLD

REPORT ON
ACTIVITIES CONDUCTED WITH RESPONSIBLE CONSUMPTION AND
PRODUCTION

Youth Health Mela is a 5 day Health Awareness Program organized by Cancer Institute. We participated in the Mela by putting up a stall on Food Adulteration; Our Knowledge partner was Parikshan charitable trust. The Schedule of the Mela was from 9am to 8pm. There were about 62 stalls. Participants were Common crowd and Students from various schools and colleges. Each day they conducted various competitions and Symposium for students on February 2019.

Day 1- Our stall number 27 had displayed 8 adulteration and awareness experiments on basic Food items. There were around 1000 participants. The Inauguration took place by 5.30pm. Chief Guest for inauguration was **Dr. V. Shanta**, chairperson, Cancer Institute, **Mr.Vellaiyan**, President, Tamilnadu Vanigar Sangankalin Peravai.

Event: Millet based food demonstration

Symposium: Reducing the exposure to NCD risk factors for youth at schools and Role of Media in NCD prevention.

Day 2 - We introduced one more experiment on Taste Buds using different Fruits and Vegetables. We had around 800 participants for our stall. Our Stall was covered by Times of India and Various Photographs were taken on the Experiments.

Event: Millet based Food Demonstration

Symposium: Food and Health for Corporates and Environment and Health for Eco-clubs and NGOs.

Day 3 - We introduced two more experiments on Benefits of Egg and Balloon Exercise. We had around 1000 Participants. Times of India published article on our experiments. All of us participated in the symposium titled “**Role of Food Handlers in NCD prevention**” organized by Hotel Kohinoor Asiana and received Certificates.

Events: Mime competition for school students and Mime competition for school students

Symposium: Role of traders in NCD prevention and Role of food handlers in NCD prevention.

Day 4 – On seeing the Article titled “**Adulterated Products can cause Stomach, Kidney Ailments A drop of this, pinch of that TO TEST TAINTED FOOD**”, the arrival of public increased.

Events: Cookery competition for school students, Street play competition for school students and Street play competition for college students.

Symposium: Professional social workers in public health.

Day 5

Event: Run for Life – A marathon

Symposium: Role of ‘Street parliaments’ in NCD prevention and Professional social workers in public health. Validation program was held by 5pm. **Mr. T. Mathivanan**, Madras High court, Chennai and

Dr. P. Vanangamudi was the Chief Guest.

Voting system for the Best stall was open to the participants from Day. Based on the voting, our stall was awarded “**The Best Stall of 3rd Youth Health Mela-2014**”.



**REPORT ON VARIOUS SOCIAL ACTIVITIES CONDUCTED WITH
ASSOCIATION OF NGOs**



Rotaract Club of HITS

About Rotary

Rotary International is a global community of committed professionals working together to serve others and advance peace. More than 1.2 million members in over 34,000 Rotary clubs worldwide volunteer in communities at home and abroad.

About Rotaract

Rotaract is a service club for young men and women ages 18 to 30 who are dedicated to community and international service. Its membership totals over 184,000 in more than 8,000 clubs worldwide. Rotaract clubs are self-governing and self-supporting and can be either university- or community-based. Individual Rotary clubs sponsor Rotaract clubs and offer guidance and support, making the Rotaract clubs true “partners in service” and key members of the family of Rotary.

Service Projects

Rotaract clubs carry out two service projects each year, one that assists the local community and one that helps a community in another country. These projects are a great way for Rotaract clubs to get involved in their own community, connect with young adults globally, and attract new members.

Information on six community service priorities:

- **Peace and conflict prevention/resolution,**
- **Disease prevention and treatment,**
- **Water and sanitation,**
- **Maternal and child health,**
- **Basic education and literacy, and**
- **Economic and community development.**

ROTARACT CLUB OF HITS

RCHU conducts many events for the welfare of the society and to the poor background children's. It joins with community rotaract clubs in the district and with the other international district of rotaract club. Mainly RCHU concentrates on the fund raising events

The list of events conducts based on services

- Club services
- Community service
- Professional service
- International service

Programme Details for the Last 3 Academic Years

Sl. No	Academic Year	No. of programmes Organised	No. of Volunteers	No. of Students donated blood	No. of awards Received
1	2018 - 19	16	200	676	2
2	2017 - 18	16	200	674	2
3	2016 -17	15	200	559	2

Programmes organised in the Academic Year 2018-2019

Sl. No	Date	Programme	No. Of Participants	Place
1	16 th July to 22 nd July	Swachh Bharath Summer Internship camp	50	Kayaar, Illalur, Venbedu, Thirupporur, Kelambakkam
2	04/08/2018	Independence day ride	150	Padur to Kovalam
3	15/08/2018	Independence day celebrations	50	Kelambakkam Govt., Girls High school
4	01/09/2018	Vanavasam Trip	30	Crocodile Park, Nemmili
5	24/09/2017	Blood donation camp(NSS day)	673	HITS
6	October 1 st week	Kerala flood relief	200	HITS
7	15/10/2018	Safe Hands	80	HITS
8	24/10/2018	Polio free day	50	Besant Nagar Beach
9	2/12/2018	Swasth 2.0	200	Kayaar, Illalur, Venbedu.
10	26/01/2019	Republic day celebrations	250	GGHS, Kelambakkam
11	14/02/2019	Blood donation camp	583	HITS
12	15/02/2019	Rotaract Conference	40	RA Puram.
13	13/03/2019 to 17/03/2019	Rotaract Week Celebrations	40	HITS, kelambakkam.
14	25/03/2019	Dental camp	150	HITS
15	01/04/2019 and 02/04/2019	First Respondent Training	100	HITS

16	20/07/2019	Unnat Bharat Abiyan Household survey camp	50	Kayaar,Illalur.
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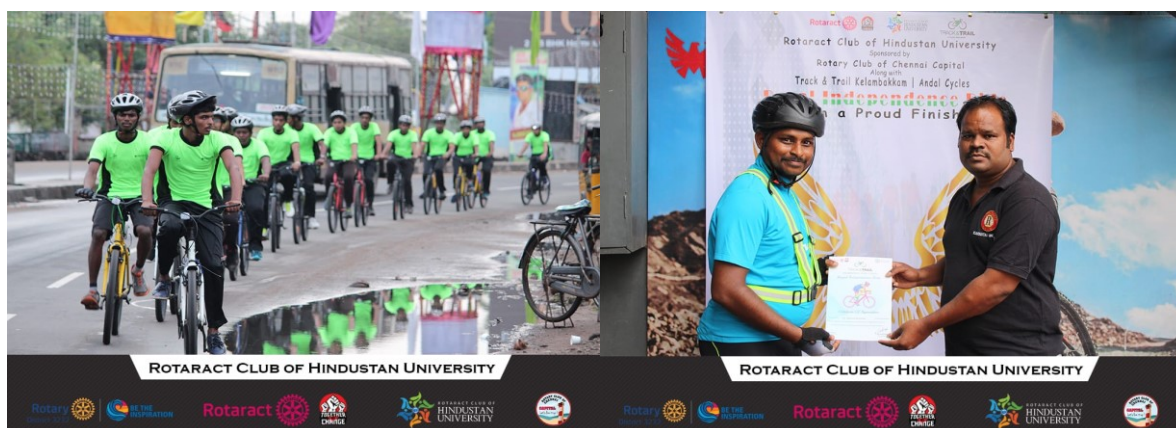
1. Swachh Bharath Camp

Nss cell organised swachh Bharath camp from 16th July to 22nd July at our adopted villages(Kayar,Illalur,Venbedu,Padur,Kelambakkam). 50 students were participated in the camp.



2. Royal independence ride

NSS and Rotaract club of HITS has jointly organized the Royal Independence ride in view of Independence day on 4th August 2018.Around 150 volunteers participated in the event.



3. Independence day celebrations.

NSS cell and Rotaract club HITS has jointly organized the independence day celebrations in Govt. Girls High school kelambakkam on 15th August 2018.Rtn Sanjay Goel, President Rotary club of Chennai capital has inaugurated the event. Prizes were distributed to the school children’s who participated in the competitions.



4. Vanavasam trip

NSS cell and Rotaract club of HU jointly organized an educational trip to Crocodile Park, Chennai for 210 children's of Government Primary school, Thirupporur on 1st September 2018.



5. Blood donation camp

NSS cell and Rotary club of Chennai capital jointly organized blood donation camp on 7th September 2018. Rtn. Sanjay Goel inaugurated the event. 673 units of blood has been collected and given to Royapettah Govt Hospital, Childrens Hospital, Adyar cancer Institute, KMC mobile unit.



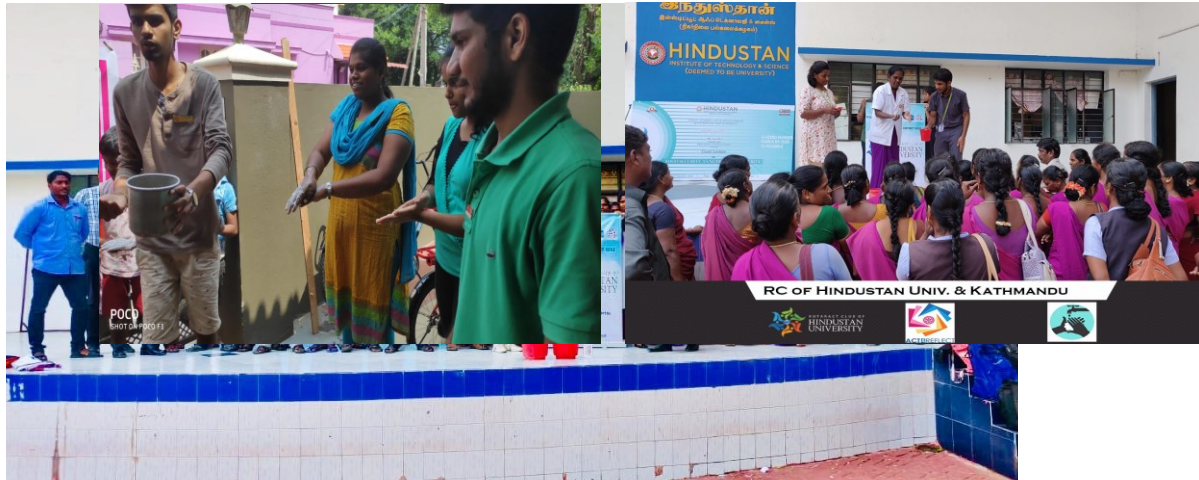
6. Kerala Flood Relief

NSS cell has organised Kerala Flood relief drive in which relief materials worth Rs.30 lakh has been sent to Kerala. Rs50 lakh was given to chief minister's relief fund by our University.



7. Safe Hands

The NSS cell and Rotaract club of HU organized an event called “SAFE HANDS” on October 15th 2018 in view of International Hand washing day. 80 of our House keeping staffs were given awareness on How to wash hands to make their lifestyle hygiene.



8. Rotary Youth Leadership camp.

Rtr. Rajvi has attended the Rotary Youth Leadership camp organized by Rotary International District 3232 from 28th Sep to 30th Sep 2018 at Grand Oceana Resort, Chennai. She also won the Rotary Youth Leadership Award (Best Female Rylarian) on the occasion.



9. MAYVI(MAke Your Vimana) 24 Hour National Aero modelling competition.

Rotaract club of HITS and the Aero astro club jointly organized an Event called “MAYVI” a national Level Aero Modelling competition (24 hours) On 6th and 7th October 2018 in Hindustan Institute of Technology and science.. The event was inaugurated by Rtn Sanjay Goel, President, Rotary club of Chennai Capital. Around 30 Teams from various colleges have participated and awarded with cash prizes and mementos.



10 m
 Four of our Rotaract Club of HITS members attended the Madras Rotary Youth Leadership camp organized by Rotary International District 3232 at Green coconut Resort, Chennai from 12th to 14th October 2018.

11. Polio Free Day

Twenty of our Rotaract club of HITS members Participated in the Polio free day campaign organized by Rotary International District 3232 on 24th October 2018 at Besant Nagar along with Rotary club of Chennai capital. A day long campaign was conducted in such a way to let India know the tremendous efforts put in by Rotary in eradicating Polio out of the country.



12. Swasth 2.0

The Rotary club of Chennai capital along with Rotaract club of HITS has organized an eye camp and TB screening camp in our adopted village Kayar on 2nd December 2018. Radhathri Nethralaya helped us in identifying cataract patient in the village and operation was successfully done in the subsequent days. Huma care helped us in identifying TB patient by taking X Ray on the camp itself. Around 200 villagers have benefitted. Rtn. Sanjay Goel inaugurated the event.





HINDUSTAN GROUP OF INSTITUTIONS

Dr. Anand Jacob Verghese, CEO, HGI and Mr. Ashok Verghese, Director, HGI handing over a cheque for **Rs. 50 Lakhs** towards the Kerala Chief Minister's Flood Relief Fund to Shri Pinarayi Vijayan, Chief Minister of Kerala.

HINDUSTAN 4 KERALA

GOD'S OWN COUNTRY

Hindustan also sent about Rs. 30 Lakhs worth relief materials to Kerala flood victims (Total Value Rs. 80 Lakhs).

- H4K continues its Relief Camp.
- More & more materials required by flood victims.

Contact: Mr. K. Gnanasekaran

NSS Coordinator,
Hindustan Institute of Technology & Science, Padur

Mob: **+91 98840 83855**

Email: nss@hindustanuniv.ac.in



13. Republic Day celebrations

NSS cell and Rotaract club of Hindustan university jointly celebrated the Republic day on 26th January 2019 at Govt., Girls Higher secondary school, Kelambakkam. . Around 250 students participated in the event. A session on plastic ban was given by Rtr Pooja and a session on Scope for higher education by Rtr Risivats. Both the sessions were interactive and the students participated actively. The event ended with the distribution of refreshments to the students.



14. Blood donation camp

NSS cell of HITS in association with Rotary Club of Chennai Capital (RCCC) organized blood donation camp at HITS, Padur on 14th Feb 2019 in view of Founder's memorial day..Dr.Mrs.Elizabeth Varghese, Chancellor, HITS was the chief guest and Rtn. Apoorva J Modi, Secretary; RCCC was the Guest of honor for the event. Madras voluntary blood bank has coordinated with Adayar cancer Institute, Royapettah Govt Hospital and Indian Red Cross for the blood banks. The students and faculty of HITS actively participated in the blood donation camp and a total of 583 units were collected.



15. Rotaract Conference

40 Rotaractors attended the Rotaract Conference conducted by Rotary district 3232. Mr.K.Gnanasekaran, NSS coordinator was awarded for the contribution towards Rotaract movement in Preconference(MATRAM) conducted by Rotary international district 3232 on 15th Feb 2019. Rtr.Risivats, Rotaract club of HITS (RCHU) was awarded as " Efficient sportsman Award " in Namma year heroes conducted by Rotary international District 3232 on 14th Feb 2019. Rtr.Vempati Bala Tatwikk was awarded as " Budding CEO Award" in Namma year heroes conducted by Rotary international district 3232 on 14th Feb 2019.



16. Rotaract Week Celebrations

Rotaract club of HITS has organized a series of events in view of World Rotaract week (13th March 2019 to 17th March 2019). Cycling event was conducted on 13th March 2019 to create awareness on Health. Designing workshop was conducted on 13th March 2019 for our Rotaractors in HITS campus and Rtr.Tatwikk was the speaker. Pollution awareness camp was conducted on 14th March 2019 in Govt Girls Higher secondary school, Kelambakkam.



17. Annual day celebration in Government school

NSS cell has organized an annual day event in Govt., school at Thirupporur on 15th March 2019 and also distributed two Laptops to the school for the benefit of the children. Laptops were sponsored by Rotary club of Chennai capital.



18. Roto Olympics

Rotaract club of HITS has co-hosted the ROTO OLYMPICS held at Nehru stadium on 17th March in view of world rotaract week. Around 40 rotaractors participated in the event. The event was sponsored by Rotary club of Chennai capital.



19. Dental Camp

NSS cell along with 'The Dentist' valasaravakkam have organized the dental camp on 25th March 2019 in HITS campus for the benefit of students and staffs.



Hindustan University have organized "First Responder HITS Campus. The training was given by Alert NGO in 100 students participated in the event. The event was sponsored by Rotary International District 3232.



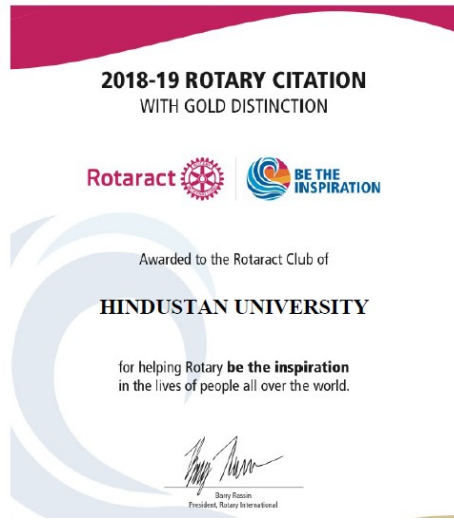
21. DRR Visit

The District Rotaract Representative Visit was organized by Rotaract Club of Hindustan University on 4th April 2019 to Present and submit the annual report to Rotaract District officials. Around 50 Rotaractors attended the event and also awards were presented to rotaractors who have contributed exceptionally well.



22. Rotary Citation

Our Rotaract club of Hindustan University has received Rotary citation with Gold distinction for helping the Rotary being the inspiration in the lives of people all over the world for the year 2018-2019 by Rotary International.



23. Unnat Bharat Abhiyan

Our NSS cell and Rotaract club of Hindustan university have started the Unnat Bharat Abhiyan activities in the adopted villages. The Village survey and Household survey were completed in Kayaar village on 20th July 2019.



24. Rotaract Club Installation

Rotaract club of Hindustan university had its 5th Installation ceremony along with RACHCAS, RACHIET, RACKCG On 24th July 2019 in

Hindustan International School campus, Guindy. Rtn. Ashokraja, Director, Youth services 2019 -2020, was the chief guest and Rtn. Ashok verghese, Director, HGI was the Guest of honor for the event.



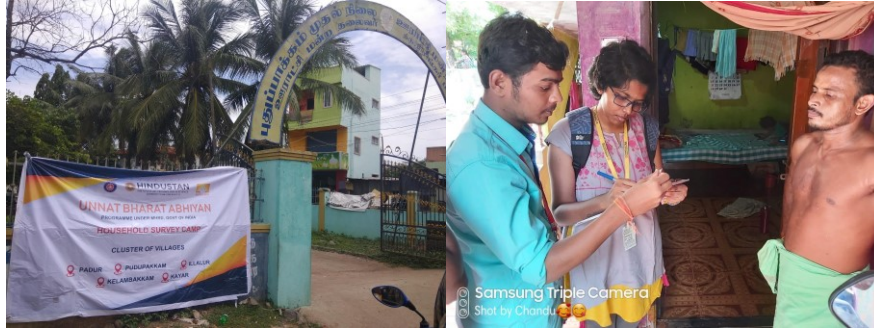
24. Sudhandira dhinam & Rainwater Harvesting awareness campaign.

Our Nss cell and Rotaract club of Hindustan university have celebrated the 73rd Independence day at Govt., Girls Higher Sec.School, Kelambakkam on 15th August 2019. Rtn.Alok Mimani was the chief guest and Rtn. Pranav was the guest of honour for the event.



25. Unnat Bharat Abhiyan

Our NSS cell conducted various competitions among Government School Students on the theme “Rain Water Harvesting”. On 13th August 2019. The Village survey and Household survey were completed in Illallur and Pudupakkam village on 17th August 2019.



26. Rotaract Club Orientation

Rotaract club of Hindustan university had its Orientation ceremony On 20th August 2019 in MGR Hall, HITS. Rtn.PDRR. Solomon victor was the speaker of the event. Dr.Manvel Raj, Dean Student affair has inaugurated the event. Around 250 students were participated in the event



27. One Student One Tree project

Hon'ble HRD Minister Dr. Ramesh Pokhriyal "Nishank" has launched a new campaign "One Student One Tree" on 20th July. This initiative is in line with the Hon'ble Prime Minister's idea of a green and healthy environment. This initiative need support of our young dynamic students and teachers. As a responsibility towards mother nature and contribution to this initiative, AICTE recommend every institute to carry out a plantation drive. One student one tree scheme was inaugurated by Dr.M.P.Poonia Vice chairman,AICTE on 7th Septmeber 2019 along with Dr.K.P.Isaac, VC,HITS, and Dr.Abysam,Director.



28. Blood donation camp

NSS cell of HITS in association with Rotary Club of Chennai Capital (RCCC) organized blood donation camp at HITS, Padur on 24th September 2019 in view of NSS day. Dr. Mrs. Elizabeth Varghese, Chancellor, HITS was the chief guest and Rtn. Sathish Jeyabalan president, Rotary club of Chennai capital was the Guest of honor for the event. Madras voluntary blood bank has coordinated with Adyar cancer Institute, Rajiv Gandhi Govt Hospital and Kilpauk medical college for the blood banks. The students and faculty of HITS actively participated in the blood donation camp and a total of 488 units were collected.

29. Swachatta Hi Seva Campaign

NSS Cell of Hindustan Institute of Technology and Science, Chennai has organized an awareness rally on 24th September about the use of plastic and its effects. More than 100 students have participated in the event and more than 2000 students were given awareness through this rally.





30. Fit India Run

"Fit India" Rally was conducted by HITS in collaboration with Chennaiyin F.C on 02.10.2019 to promote fitness and hygiene in all citizens, on the auspicious occasion of 150th Birth Anniversary of the Father of the Nation. About 300 students (Hostelers, NSS , NCC & Sports) and staff participated in the rally with zeal & enthusiasm.



Members of Y's men club of Hindustan youth have attended a 3-day camp on 1st, 2nd and 3rd November 2019 and they have been selected as district and to attend the Area camp at Connor on 27th,



32. Rain Coat Distribution.

Y's men club of Hindustan youth along with Y's Men Club of Mylapore, Y's service club of Karapakkam, Y's men club of OMR and Y's men club of Padappai have organized "500 Raincoats to underprivileged school children" event on 8th November at KCG college of technology. The Raincoats were sponsored by the KCG Varghese charitable foundation executed by YMC of Mylapore and its sponsored clubs. The raincoats were distributed by Regional director HRM Ysm M.Prabhakaran in the presence of the patron and advisor HRM Ysm Dr.Anand Jacob Varghese



33. Diwali Celebrations

Y'S Men Club Of Hindustan Youth in association with Y'S Men club of Mylapore & Y'S Men Club of Chennai OMR Celebrated Diwali by Distributing Sweets to Needy people at Irular Colony, Thiruporur on 26th October 2019.

Rotaract club of Hindustan University celebrated Diwali at differently abled people's Home in Padur village. The team spent their time by entertaining them with songs and dance followed by distribution of books to the children. Team also presented them sweets, gifts and helped them for medical expenses. The event was sponsored by Rotary club of Chennai capital.



Programmes organised in the Academic Year 2017-2018

Sl. No	Date	Programme	No. Of Participants	Place
1	17/06/2017	Bag to school	50	KCG college of technology
2	15/08/2017	Sudhandhira Bharatham	50	GGHS school, Kelambakkam
3	1/09/2017 to 15/09/2018	Swachh bhakwada	100	Kelambakkam
4	21/09/2017	Awards function	20	MVBB
5	23/09/2017	NSS Day	188	HITS
6	6/10/2017	SWASTH	200	GGHS SCHOOL, Kelambakkam.
7	12/10/2017	Pollution free Diwali	50	HITS
8	19/11/2017	Feeding of 1000 poor children	1000	koothavakkam
9	24/11/2017	Rain coat to Govt school students	1000	Govt schools.
10	10/11/2017	Rotary Youth Leadership camp	120	HITS
11	04/2/2018	OMR RUN	650	Satyabhama university

12	14/2/2018	Blood Donation camp	430	HITS
13	16/7/2018 to 22/2/2018	Swachh Bharath Camp	80	Kayaar.
14	4/8/2018	Royal independence ride	100	HITS
15	15/8/2018	Independence day celebrations	200	GHSS,Kelambakkam
16	7/9/2018	Blood Donation camp	673	HITS

National Service Scheme
Hindustan Institute of Technology and science
Annual Report

1. Bag to School Project.

NSS cell coordinated the “Bag to school project” on 17th June 2017, organized by Y’s Men club of Mylapore in which 1000 Govt school students were given a Bag, notebook, dictionary . The programme was inaugurated by Ysm .Dr.Anand Jacob Verghese

2. SudhandhiraBharatham

NSS cell and Rotaract club of HU jointly celebrated the Independence day on 15th August 2017 at Government Girls Higher secondary school,Kelambakkam and distributed the prizes.

3. SwachhtaPakhwada

100 volunteers from Nss cell celebrated SwachhtaPakhwada from 1stSeptemper 2017 to 15thseptemper 2017 and did cleaning campaign in near byvillages,orphanage and hospitals

4. Award Received from Madras Voluntary Blood Bureau (MVBB)

NSS Cell received an Award from Madras Voluntary Blood Bureau for Mobilized than 540 units of blood during the academic year 2016-17. The award function organised on 21st September 2017 at T.N.Rajarathinam Hall R.A.puram.

5. NSS Day Celebration

NSS Cell of HITS, Rotary Club of Chennai Capital (RCCC) and Rotaract club of HITS(RCHU) jointly celebrated the NSS Day on 23rd September 2017.NSS, RCCC, RCHU and Madras Voluntary Blood Bureau jointly organised the Blood Donation camp on 23rd September 2017 at MGR Hall HITS. **Rtn. Alok Mimani, District, president** RI District 3232 was inaugurated the camp. The blood banks from Government Hospital and VHS collected **188 units** of blood from the students and staff.

6. Award received by the student

Rtr.Rishivats received the “Best Rylarian Award “ in RYLA ECR on 30th September 2017 conducted by Rotaract club of ECR.

7. Regional Youth camp

Five of our NSS students participated in the ‘Youth Camp “ Organized by Y’s men International on 3rd November 2017 at HITS

8. Project Swasth

NSS cell and Rotaract club of HU jointed organized the eye camp and dental camp on 6th October 2017 at Govt Girls Higher secondary school, Kelambakkam. 400 students were benefited.

Mr. Alok Mimani, President , Rotary club of Chennai capital inaugurated the “Girls rest room” donated by Rotaray club of Chennai capital.

9. Pollution free Diwali

NSS cell organized a Pollution free diwali campaign on 12th October 2017 at Padur village to create awareness on pollution.

10. Feeding of 1000 poor children

Nss cell coordinated the “feeding of 1000 poor children “ project on 19th November 2017 ,sponsored by Y’smen club of Mylapore in which 1000 Poor students in Koothavakkam village got benefited.

11. Rain coat to schools

Nss cell coordinated the “Rain coat to schools “ Project on 24th November 2017, Organized by Y’s men club of Mylapore in which 1000 Govt school students were given Rain coat. The Programme was inaugurated by HRM. Ysm .Dr. Anand Jacob verghese .

12. Science Squad

NSS cell and Rotaract club of HU jointed organized “ Science exhibition” on 25th November 2017 at Govt Girls Higher Secondary school Kelambakkam.

13. Rotary Youth Leadership Award(RYLA) I Programme

Rotaract club of Akash and Rotaract club of HITS jointly organised the” Rotary Youth Leadership Award program” from 10th November 2017 to 12th November 2017 at HITS. 120 volunteers were benefitted

14. Exam kits to school students.

Nss cell and Rotaract club of HU jointly gave the exam kits (Pen ,Pencil,scale etc.,) to 100 students on 23rd March 2018 at Govt Girls Higher secondary school,Kelambakkam.

15. OMR RUN

Rotary club of Chennai upscale organised the “OMR RUN” fund raising programme for charity purpose on 4th February 2018 at Sathyabama University. 650 volunteers from the Hindustan Group of Institutions participated in the event. The event was coordinated by NSS cell along with Rotraract club of HITS.

16. Blood donation camp

NSS cell and Rotaract club of HITS jointly organized the Blood Donation camp on 14th February 2018 at MGR Hall HITS. The blood banks from Adyar Cancer Institute,VHS and MGR medical institute collected 430 Units of blood collected from the students and staff.

Programmes organised in the Academic Year 2017-2018

Sl. No	Date	Programme	No. Of Participants	Place
1	10/9/17	Award Received from Madras Voluntary Blood Bureau (MVBB)	25	Chettinad Vidyasharam School, Adyar
2	21/9/17	1000 Saplings Plantation at Padur Village	120	Padur Village
3	27/9/17	NSS Day Celebrations	500	HITS
4	27/9/17	Installation programme for Rotaract Club of HITS	60	HITS
5	27/9/17	Nation Builder Award Programme	50	HITS
6	27/9/17	Blood Donation camp	600	HITS
7	27/9/17	Celebration of "World Literacy Day	450	HITS
8	7/10/17 to 9/10/17	Rotary Youth Leadership Award (RYLA	6	OMR Resorts
9	28/10/17 29/10/17	5 E-Learning Smart Class Room donated to the 5 Govt. Schools.	500	5 Govt. Schools(Padur, Kelambakkam(2) , Sembakkam, Puzhuthivakkam
10	5/11/17	50 Computers distributed to 6 Govt. Schools.	200	Padur, Kelambakkam, Puzhuthivakkam
11	4/12/17	SwachhBharath Kashmir To Kanyakumari Rotary Cycle Rally		Besant Nagar
12	24/12/17	Christmas Celebration at CSI higher Secondary School for Deaf & Dumb	60	Santhom
13	8/1/18	Rotary Youth Leadership Award	120	HITS

		(RYLA) I Programme		
14	5.02.18	OMR Run	650	Sathiyabama University
15	11.02.18	Appreciation Award received from the Rotary Club of Chennai Upscale.	5	Hiranandini Flats, Navalur

1. Award Received from Madras Voluntary Blood Bureau (MVBB)

NSS Cell received an Award from Madras Voluntary Blood Bureau for Mobilized than 436 units of blood during the academic year 2015-16. The award function organised on 10th September 2016 at Chettinad Vidyasharam School Raja Annamalaipuram.

2. 1000 Saplings Plantation

NSS cell & Madras Costal Round Table #162 jointly organised 1000 saplings plantation on 21st September 2016 at new Padur land. Tr. Shyam Ganesh Cine Actor was the Chief Guest, Mr. Ashok Verghese, Director HITS was the Guest of Honour and Tr. Sinosh President of MCRT#162 and other table members also participated.

3. NSS Day Celebration

NSS Cell of HITS, Rotary Club of Chennai Capital (RCCC) and Rotaract club of HITS (RCHU) jointly celebrated the NSS Day on 27th September 2016. The following programmes organised during the celebrations

4. Installation programme for Rotaract Club of HITS

The Installation programme for Rotary Club of HITS was organised on 27th September 2016 at Andromeda Lecture Theatre, HITS. Ms. Subhathra District Rotaract Representative was the Chief Guest and the RCCC and RCHU members participated the programme

5. Nation Builder Award Programme

One major component of the Teacher Support program of Rotary India Literacy Mission (RILM) is recognizing outstanding teachers through the “**Nation Builder Award**”. This awards aims to award an outstanding teacher after a detailed evaluation process. RCHU taken the survey from 15 Government schools and also identified the best teachers form the schools. The award function was organised on 27th September 2016 at Andromeda Lecture Theater. **Rtn. Natarajan Nagoji, District Governor, RI District 3230 was the Chief Guest and Rtn. MukundVedapudi Asst. Governor, RI district 3230 was the Guest of Honour Rtn. Ashok Verghese President RCCC, Rtn. Sriram, Immediate Past president, Ms. Subhatra DRR district 3230** and other members from RCCC and RCHU also participated. 15 government school teachers felicitated during the function.

6. Blood Donation camp

NSS, RCCC, RCHU and Madras Voluntary Blood Bureau jointly organised the Blood Donation camp on 27th September 2016 at MGR Hall HITS. **Rtn. Natarajan Nagoji, District Governor, RI District 3230** was

inaugurated the camp. The blood banks from Cancer Institute, Government Hospital, Youth Red Cross and Royapet Government Hospital collected the **559 units** of blood from the students and staff.

7. **Celebration of “World Literacy Day”**

The World Literacy day celebrated on 27th September 2016 at Andrameda Lecture Theater HITS. Dr. Expendith Senior Educational Consultant, SSA and Dr. Sridhar Asst. HM Govt. Hr. Sec. School Sembakkam, State level Resource person was the Resource persons for the programme. 100 NSS volunteers participated in the programme.

8. **Rotary Youth Leadership Award (RYLA)**

6 of our rotaracters from Rotaract club of HITS participated in RYLA programme organised by Rotary district 3230 on 7th -9th October 2016 at OMR. Our Club president Rtr. Shiva Balaji received the best Rylarian Award 2016.

9. **5 E-Learning Smart Class Room donated to the 5 Govt. Schools.**

Sl.No	Name of the School	No. of students Benefited
1	Thantai Periyar Govt. Hr. Sec. School, Kalaimagal Street PonniammanKoil main road, Puzhuthivakkam, Chennai 91	600
2	Govt. Hr. Sec. School, Sembakkam, Thiruporur	710
3	Government Boys Hr. Sec. School, Kelambakkam	1050
4	Government Girls Hr. Sec. School, Kelambakkam	650
5	Govt. Middle School, Rajiv Gandhi Salai, Padur, Kelambakkam	180

The smart classroom projector installation was done on 28th& 29th October 2016 at Government Middle School Padur and Government Higher Secondary School Sembakkam.

10. **50 Computers distributed to 6 Govt. Schools.**

Ford India Ltd, Perungudi donated 50 computers to the 6 Govt. schools surrounded from our University.

Sl.No	Name of the School	No. of computers sanctioned
1	Govt. boys Hr. Sec. School, Kelambakkam	20
2	Thanthai Periyar Govt. Hr. Sec. School, Puzhuthivakkam.	10
3	Govt. Middle School, Padur	4
4	RC Govt. Aided primary School, Kelambakkam	3
5	Panchayath Union Elementary School, Kelambakkam	3
6	Swami Dhayanantha Primary School Thanjavur	10

11. **SwachhBharath Kashmir To Kanyakumari Rotary Cycle Rally**

20 Rotaracters from RCHU club participated in SwachhBharath Kashmir toKanyakumari Rotary Foundation Centennial Cycle Rally on 4th December 2016 at Besant Nagar Beach, Besant Nagar organised by Rotary club of Madras Midtown, Greater Chennai Corporation and Ministry of Urban Development Govt. of India.

12. Christmas Celebration at CSI higher Secondary School for Deaf & Dumb

On the Eve of Christmas 20 rotaracters from the Rotaract Club of HIET & HITS jointly celebrated Christmas at CSI Higher Secondary School for Deaf & Dumb Mylapore with cakes and cool drinks on 24th December 2016. Rtr. Karthick, Director Youth Service and Rtr. Tejas, Director Community Service donated the provision items to the School.

13. Rotary Youth Leadership Award (RYLA) I Programme

RC of Zenith and RC of HITS jointly organises the Rotary Youth Leadership Award program from 6th January 2017 to 8th January 2016 at HITS. 120 volunteers benefited

14. OMR RUN

Rotary club of Chennai upscale organised the “OMR RUN” fund raising programme for charity purpose on 5th February 2017 at Sathyabama University. 650 volunteers from the Hindustan Group of Institutions participated in the event.

15. Appreciation Award received from the Rotary Club of Chennai Upscale

NSS cell and Rotaract club of HITS received the appreciation award for the valuable support in OMR RUN. The award received the International Night Programme on 11th February 2017 at Hiranandini Flats

WASTE MANAGEMENT REPORT

Recovery of Hydrogen from Sulphide Industrial Waste (Funded by SERB, DST)

Sulphide (S^{2-}) in wastewater is corrosive and has a very unpleasant odour. As the most reduced form of sulphur, sulphide has a high oxygen demand of 2 mol O_2 /mol S^{2-} and its discharge depletes oxygen. Millions of tons of H_2S is desulfurized and detoxified every year in petroleum refineries with unrecoverable energy input. Also natural gas fields contain about 30% H_2S in their output, which is certainly a non-negligible amount. Considering all these resources and the intrinsic toxicity of H_2S , it becomes obvious that the visible light mediated photocatalytic decomposition of H_2S could cause the twin benefits of sustainable solar hydrogen production and an aesthetic environmental abatement.

(Published 8 research papers in referred Journals in this research topic)

CO₂ Sequestration:

The catalytic conversion of carbon-di-oxide with ethanolamine solution that sequesters carbon-di-oxide and results in zero emission of carbon-di-oxide. Though the Monoethanolamide solutions are used for CO₂ sequestration in the conventional system itself, the way of sprinkling with the help of new designed reactor for portable attachment in vehicules helps in control of CO₂ emissions.

Received Hindustan Innovative Awards 2017 for this innovative research on CO₂ Sequestration

Biogas production from food waste along with novel waste materials

Refuse is too often regarded as useless, unwanted and therefore discarded. Waste is defined as “anything rejected as worthless, or in excess of what is required”. But Byrne (Byrne, 1997) said that waste is material, which has no direct value to the producer and so must be disposed of. Bailie et al. (Bailie et al., 1996) insist that “for practical purposes, the term ‘waste’ includes any material that enters the waste-management system”, i.e. organized programmes and central facilities established not only for final disposal of waste but also for recycling, reuse, material reclamation, composting and incineration (Igoni et al., 2008).

MSWM is one of the major environmental problems of Indian megacities. Municipal solid waste generally includes degradable (paper, textiles, food waste, straw and yard waste), partially degradable (wood, disposable napkins and sludge) and non-degradable materials (leather, plastics, rubbers, metals, glass, ash from fuel burning like coal, briquettes or woods, dust and electronic waste) (Jha et al., 2011; Herat, 2009; Tchobanoglous et al., 1993). The food wastes have high organic content and hence its treatment by the process of bio-methanation is most viable as it produces useful products like biogas and enriched manure. In this study, we have conducted lab-scale bio-methanation studies for biogas recovery from food waste generated from hostels in Hindustan Institute of Technology and Science (HITS). We have achieved maximum quantity of biogas production from food waste along with novel waste materials.

CLEAN ENERGY POLICY

POLICY CREATED DATE	2011
POLICY REVIEW DATE	Every Six Month
CREATED BY	Electrical Engineering Department
RESPONSIBILITY	HOD EEE

The issue of renewable energy sources that have great potential to give solutions to the long standing energy problems of India has been considered. It has been stated that renewable energy

Sources are an important part of India's plan to increase energy security and provide new generation with ample job opportunities. India's plans to move towards green technology and address environmental concerns associated with the country and the world have been characterized.

Understanding the above mentioned importance of clean energy, policy is implemented in Hindustan Institute of Technology and Science (HITS) for sustainable and clean energy.

Hindustan University won the Best Green Campus Award for the project Hindustan University Green Yuvatharang (HUGY). Bay Range Hindustan campus is built amidst a lush green stretch of over 150 acres abutting beautiful lakes. The green atmosphere is conducive for a calm and peaceful academic pursuit. The green campus has around 800 trees. This reduces the overall temperature in the campus by 3 to 4 degree Celsius and they absorb the entire atmospheric pollutants spewed by the vehicular emissions.

The Centre for Clean Energy and Nano Convergence Centre (CENCON)

The Centre for Clean Energy and Nano Convergence Centre (CENCON) was established in collaboration with Quantum – Functional Semiconductor Research Centre (QSRC) of Dongguk University with an objective to promote awareness, importance, basic and applied research in clean energy.

Initiatives

As a part of the energy awareness and conservation programme, HITS have and will hosts numerous workshops and training sessions on a regular basis. Energy Conservation week will be observed every year during month of march. The 3rd and 4th days of the aforesaid week, will be observed as 'No Air Conditioner' and 'No Automobile' days respectively.

USE OF ALTERNATIVE ENERGY SOURCES

1.5kW Micro Wind Turbine had been installed on the roof top of Founders' block during January 2012 as a means of energy conservation.

100 kW Solar rooftop grid connected Power system is installed at our university which produces 800 Units of electricity per day. 1kg of coal when burnt produces 840g/kWh of Co₂ emission to the atmosphere. Co₂ being a green house gas, causing global warming will be prevented. By this green and clean installation, 67.2kg of Co₂ emission to the atmosphere is prevented. The electricity cost will be saved to the extent of Rs.6000 per day.

SOLAR PANEL CLEANING ROBOT (SOPAC), Massive price drops for solar technology are driving more installations, and solar power is expected to represent the cheapest form of energy around the globe. The efficiency losses of solar power plants are due to dust and other types of dirt layered over the panel. The efficiency loss is estimated around 25% in India and 35% the Middle East (monthly) due to less light coming through the solar cells. SOPAC is an autonomous, self-driven, battery operated solar panel cleaning robot works on a cost-effective solution to increase the efficiency of solar energy.

ASME's International Human Powered Vehicle Challenge will be hosted every year to provide an opportunity for the students to develop practical and sustainable modes of transportation.

Prime academic, tutorial, administrative and other spaces in all buildings are designed to take maximum advantage of ample Day Light and Cross Ventilation available outside free of cost.

All Residential Blocks and Hostels are equipped with and regularly use Solar Water Heaters and Cookers. Ample use of Solar Photo Voltaic cells can be witnessed in the campus to generate Solar Power.

Energy saving Devices are used in the campus: Light with Reflector and Solar Lamp

A Wind Mill has been installed in the campus and it is utilized to pump water out of the well.

Replacement of conventional lightings with LEDs

All the newly constructed hostel blocks are installed with 10 W LED lamps and the hostel toilets and corridors are installed with 20 W and 15 W LED lamps. A few of the washrooms/ restrooms in the academic buildings are equipped with occupancy sensor based CFL light.

Biodiesel heavy vehicles and solar powered cars in campus: busses operating within the campus are powered with 30% biodiesel. These vehicles have covered more than 60,000 km without any breakdown.

Design of an Energy Efficient Building

Implementing a whole-building systems approach to new construction.

The design should make efficient use of water and electricity and other natural resources and energy sources.

The design should strive to meet the Energy Star requirements for sustainability, the Leadership in Energy and Environmental Design (LEED) standards, and the International Green Construction Code (IgCC).

The design should take into consideration building orientation. The way a structure is situated on a site and the placement of windows, rooflines and other features is critical for efficiency.

Utilizing an energy modeling software is an effective way to estimate a building's energy use.

Purchase ENERGY STAR labeled office equipment which can save as much as half the electricity of standard office equipment.

Private Virtual Desktop Cloud Infrastructure (VDI)

Advantage of VDI over traditional Desktop is its lower power consumption, (37Watts/Node) which sums up to an annual saving of around INR 1 million.

The transportation policy

The transportation policy at HITS is unique. The students residing in the hostels are encouraged to use bicycles. They are not permitted to own any vehicle that uses fossil fuel.

Battery operated vehicles to reduce emission.

Programmes / Courses Offered

Students are a critical voice in moving campuses to be more sustainable and transition towards 100 percent renewable energy. Various programmes and courses will be introduced in upcoming academic years with relevant to clean energy and sustainable energy. It allows us to train young activists, future leaders and researchers to advocate for clean energy off-campus and in their communities.

Proposed courses are:

Ph.D in Energy Efficient Architecture

Ph.D in Renewable Energy

B.Arch in **Energy** Efficient Design

ETHICAL SOURCE OF FOOD SUPPLIES POLICY

POLICY CREATED DATE	2011
POLICY REVIEW DATE	Every Six Months
CREATED BY	HOD Bio-Tech and Food Technology
RESPONSIBILITY	HOD Bio-Tech

HITS's sustainable procurement policy focuses on sustainability, seasonality and provenance.

HITS is a purchaser with more than 57 suppliers, so it is essential to develop trusting, mutually beneficial, long-term relationships to guarantee the quality and safety of products across our supply chain.

We respond to client and customer expectations through our values by promoting purchasing policies that increase the use of environmentally sound and ethically sourced products. We encourage our suppliers to share our ethical principles and procurement commitments. As such, we expect them to comply with our supply chain code of conduct, which covers human rights, business ethics and environmental management practices.

Our approach to sustainable supplies includes sourcing products that meet industry marques and partnering with suppliers from the regions where we operate. We believe that, wherever possible, we should purchase fairly traded and ethically sourced products. This ensures better trading conditions for producers and helps us build lasting relationships with global suppliers that have sustainable business.

HITS's sustainable procurement policy focuses on sustainability, seasonality and provenance. We continually review our logistics arrangements in order to reduce delivery miles.

Eco-actions include promoting the use of ceramic mugs or glass cups for beverages to save on paper products, recycling office supplies such as discarded paper, purchasing recycled paper, and using refillable pens.

The institution has also placed large bins at different points on each floor to segregate wet and dry waste. To ensure this, and minimize the use of garbage bags, it does not allow dustbins at individual class rooms.

As a part of green initiative, we have replaced the plastic tableware in cafeteria with reusable cutlery.

Supporting local Organic Farmers and Their Communities by purchase of organic vegetables and providing awareness programme.

Expectations from Suppliers

- We expect our suppliers to support the ethical standards set out in this Policy with regard to workplace safety, environment, and fair pay and employment conditions in their work place.
- The Policy sets out the standards that we expect all of our suppliers to comply with when producing and supplying products for HITS.
- Suppliers shall not engage in acts of bribery and corruption and shall not falsify documents and records.
- Employment is freely chosen, there is no forced, bonded or involuntary labour. Suppliers will ensure that personal protective equipment is available and workers are trained in its use.
- HITS supports ILO Convention 138 with regard to the appropriate age of workers and will not work with suppliers who use child labour.
- Wages and benefits paid for a standard working week meet, at a minimum, national legal standards or industry benchmark standards, whichever is higher. In any event wages should always be enough to meet basic needs and to provide some discretionary income.
- In any event, workers shall not on a regular basis be required to work in excess of 48 hours per week and shall be provided with at least one day off for every 7 day period on average. Overtime shall be voluntary, shall not be excessive, shall not be demanded on a regular basis and shall always be compensated at a premium rate.
- There is no discrimination in hiring, compensation, access to training, promotion, termination or retirement based on race, caste, national origin, religion, age, disability, gender, marital status, sexual orientation, union membership or political affiliation.
- The facility shall comply with national and local environmental laws and regulations *f* The facility shall dispose of its production waste in accordance with local environmental laws and regulations *f* The facility must have identified and documented its key environmental impacts and implemented controls to minimize its impact on the environment with respect to solid waste disposal, hazardous chemicals storage and management, air and water emissions.

Compliance with the Policy

HITS's expects its suppliers to comply with all aspects of this Policy, and will be extending its coverage of audited facilities and compliance monitoring processes to include these standards.

HITS's is committed to working in partnership with its suppliers to help achieve compliance with this Policy. In the event where any supplier is unwilling or unable to demonstrate continuous improvement towards full compliance with our standards, the trading agreement between Woolworths Limited and the supplier will be terminated.

Key Contacts

For more information on HITS's Ethical Sourcing and Sustainability policies visit our website at www.hindustanuniv.ac.in

SUSTAINABLE WASTE MANAGEMENT POLICY

POLICY CREATED DATE	2011
POLICY REVIEW DATE	Every Six Months
CREATED BY	HOD Civil and Chemistry
RESPONSIBILITY	HOD Civil

Hindustan Institute of Technology and Science (HITS) is committed to enhancing the health and wellbeing of its campus community, to increasing safety practices, to reducing consumption of energy and fuels, to minimizing emissions, and to reducing solid and hazardous wastes. Members of the University community are expected to integrate into their daily operations best practices to reduce, reuse, and recycle materials, consistent with municipal, state, and central rules and guidance.

Purpose

HITS's endeavors to adopt practices that reflect a comprehensive approach to conserving resources and reducing and managing waste. Waste prevention, reuse, recycling, and composting are prioritized over landfill disposal. In order to minimize our environmental footprint; to provide guidance to the University community on best practices for reducing and recycling waste; and to promote adherence to environmental law, this policy establishes a sustainable, solid waste management program that communicates acceptable methods of handling, storing, recycling, and disposing of materials.

Policy Implementation

I. Waste management requirements

A. Adherence to applicable law and University procedures. All members of the HITS community are expected to handle, store, recycle, and dispose of materials in accordance with applicable law and University procedures, including all laws, regulations, and guidance documents referenced in this policy (see "Related Information" below; unless otherwise noted, the versions of such laws, regulations, and procedures currently in effect are to be followed). Specific guidelines relating to different types of waste are identified below.

B. Municipal solid waste. Waste streams such as non-hazardous wastes, recyclables, food wastes, and construction and demolition debris should be handled pursuant to sustain HITS's Recycling Guidelines.

C. Electronic waste. Indian law bans most forms of electronic waste from landfills in the state. All University-owned electronic waste will be recycled through Facilities Management's E- Cycling Program.

D. Hazardous waste. All University-generated hazardous waste must be labeled, handled, stored, and disposed consistent with the Office for Research Safety (ORS) guide developed to ensure that the management and disposal of hazardous waste at HITS is conducted consistent with applicable law.

E. *Universal waste*. All University-generated universal waste must be labeled, handled, stored, recycled, and disposed consistent with HITS's Universal Waste Guide.

Any questions regarding the categorization of different types of waste or the guidelines applicable to their management and disposal should be directed to either sustain HITS guide line or ORS.

Implementation responsibilities

A. Department and vendor leaders are responsible for:

- i. Reviewing operations to determine where waste can be reduced at its sources of generation;
- ii. Acquiring, to the extent feasible and practicable, items that are durable, have minimal packaging, or are readily recyclable when discarded;
- iii. Assessing purchasing decisions, making every attempt to purchase items only when needed and in amounts that are not excessive;
- iv. Ensuring employees have access to compliant waste containers, including containers for recycling; and
- v. Assuring only trained and certified employees, students, and vendors generate and label specially-regulated or hazardous wastes.

B. HITS faculty, staff, students, and vendor personnel are responsible for:

- i. Separating defined waste types and placing identified waste materials in the appropriate containers; and
- ii. Handling specially-regulated or hazardous wastes only if trained and certified to do so.

C. HITS's Office of Procurement and Payment Services is responsible for:

- i. Prioritizing procurement of goods and services that have a less negative effect on human health and the environment;
- ii. Promoting the purchase of durable and environmentally preferable products and prioritizing these purchases over procurement of single-use or disposable products; and
- iii. Establishing contracts with vendors when necessary to responsibly handle University-generated waste.

D. HITS's Office of Facilities Management is responsible for:

- i. Establishing policies for the management of construction and demolition and executing construction and demolition contracts that include specific construction debris recycling targets;
- ii. Facilitating the removal of regulated refrigerants from refrigerators and freezers and maintaining the pertinent records required by law or regulation;
- iii. Managing collection areas for the drop-off of universal waste in each building;
- iv. Providing standard trash containers; and
- v. Maintaining contracts with custodial service providers responsible for collecting non-regulated waste.

E. Northwestern's Office of 5's is responsible for:

- i. Maintaining up-to-date procedures and training on the proper disposal of hazardous, radioactive, biological, and potentially infectious wastes generated in teaching or research laboratories;
- ii. Providing approved containers for the disposal of hazardous, radioactive, biological, and potentially infectious wastes in teaching or research laboratories; and
- iii. Managing contracts for the disposal of all hazardous wastes and for hazardous waste emergency response services.

F. HITS's Center for Sustainable Energy and Environment (CSEE) is responsible for:

- i. Maintaining procedures for the handling and disposal of hazardous and universal waste in non-research areas;
- ii. Training all non-research employees handling hazardous waste about proper waste handling procedures, safe use of personal protective equipment, and emergency procedures; and
- iii. Ensuring non-research departments follow all contractual hazardous waste and hazardous waste emergency response services requirements.

G. HITS's Office of Human Resources, through its my HR Learn system, serves as a records repository of completion of required trainings for those employed by HITS. For various reasons, Office of 5's or CSEE may maintain other training records outside of the HR Learn system.

Consequences of Violating this Policy

HITS faculty, students, or staff who fail to comply with the laws, regulations, and ordinances referenced in this policy could be subject to disciplinary action under Institutions policies

and procedures, including termination of employment or academic dismissal.

The Institution may terminate its relationship with any third-party contractor who violates this policy.

Individuals who knowingly and deliberately release hazardous materials in violation of law could also be subject to criminal penalties.

AWARDS

The institution has been bestowed with Good Green Governance award five times consecutively in recognition of environment friendly initiatives in its 150 acres plush green campus. It has successfully implemented 5S Workplace Management. Hindustan believes in benchmarking with the best and ensures that highest standards of quality are implemented it envisages and challenges convention to build a future beyond and aims at achieving the status of World Class University.

- Good Green Governance G3Award 2013 under the Higher Educational Institution Category in recognition for spear-heading Green University Revolution in India.
- Won SRISHTI's Award for Good Green Governance on the Earth Day in 2018. HITS HAND BOOK 2018 - 2019 Ranked No. 3 in Tamil Nadu in Top Engineering Colleges by Competition Success Review (CSR-GHRDC) Survey.
- Good Green Governance Award 2017 Australian Service Excellence Award Congratulations Team Hindustan Achievement Talk Good Green Governance Award 2017 was given to Hindustan University at New Delhi by Mr. Kalyan Patra, CEO of SHRISHTI Publications on 22nd April 2017.