

New innovative teaching methodology

The Flipped Learning

The head of the institution, Dr Malay R Dave in his last assignment was working in the South Pacific where exactly he had his first brush with the Flipped Learning and he decided to open up flipped learning domain in India for the first time. In Flipped learning students learn & remember at home by reading digital contents already supplied to them before coming over to the class and more complex cognitive tasks such as analysing, critically evaluating, application of the concepts leading to the next stag of creation is done within the class room. Flipped Learning not only takes care of student centric learning but also sharpens the interpersonal skills of the student such as group discussions, team work, communication skills, leadership qualities etc. The students prepare the digital content through digital platforms like Blendspace while using the Digital Studios for their own inputs.

Small Steps

Though the initial groundwork for the flipped learning was done in 2016 for getting the right kind of infrastructure of the flipped classrooms & the Digital Studios for creation of the digital contents and year round training sessions for the faculty members, the flipped learning was introduced and implemented as the digital pedagogy to the first year of B Tech programme last year and we have successfully completed the first year and now migrated into the second year of B Tech programme.

Glimpses of Flipped Learning at JIS College of Engineering

Flipped Classroom



The flipped learning courses are well organized courses into weekly / topic folders; have clear learning outcomes; prepared on learning management system through digital content creation that includes flowcharts, animations, PDFs, videos, materials and activities that directly support learning outcomes. The flip classroom engage the students through interaction with the contents, other students, and the instructor; offer relevant resources to the students.

Flipped Classroom in Action



Our Digital Studios



Response from Indian and foreign Media

Our success story hit the headlines last September when the national daily The Telegraph published it in prime slot. When we collaborated with the world's first flipped University called MEF University in Istanbul, turkey, the Turkish press too lauded our success story. These you will find it in the attachments.

The Telegraph Cover Our Maiden Initiative

The Telegraph

The Telegraph October 7, 2017 India

Follow Us: [f](#) [t](#) [in](#) [v](#) Today's Edition

IN TODAY'S PAPER

[Front Page](#)
[Nation](#)
[Calcutta](#)
[Bengal](#)
[Foreign](#)
[Business](#)
[Sports](#)
[Horse Racing](#)
[T2](#)
[T2 Online](#)
[Opinion](#)
[TT Hand in Hand](#)

EPAPER

[Calcutta](#)
[North Bengal](#)
[South Bengal](#)
[Jamshedpur](#)
[Ranchi](#)
[Patna](#)
[Guwahati](#)
[Bhubaneswar](#)

CITIES & REGIONS

[Metro](#)
[North Bengal](#)
[Northeast](#)
[Jharkhand](#)
[Bihar](#)
[Odisha](#)

WEEKLY FEATURES

[Knowhow](#) Mon
[Salt Lake](#) Fri
[7days](#) Sun

LEISURE

[Sudoku](#)
[Sudoku New](#)
[Crossword](#)
[Jumble](#)
[Gallery](#)

ARCHIVES

[Front Page](#) > [Calcutta](#) > [Story](#)

Engineering explores 'flip' side of study

- KALYANI COLLEGE ADOPTS SMART LEARNING SYSTEM WHERE THERE ARE NO LONG LECTURES AND EXAMS

MITA MUKHERJEE



A topic being discussed inside one of the smart classrooms of the private engineering college in Kalyani. (Sanat Kr Sinha)

Sept. 6: A private engineering college in Kalyani has discarded conventional teaching and evaluation for a method called "flipped learning" that converts classrooms into smart workshops and studying into understanding.

JIS College of Engineering's leap of faith draws on concepts such as active learning, student engagement, hybrid course design and study materials in every possible digitised format.

Some or all of these techniques are used in combination by institutes of higher education abroad and a handful of B-schools in India. But this is the first known instance of an institute in Bengal replacing standard teaching with flipped learning to produce "more employable engineers".

Turkish Newspaper Hurriyet covering our success story on Flipped Learning

Hürriyet



Hindistan'dan MEF'e Flipped Learning ziyareti

FLIPPED Learning Aktif Öğrenme Yönetimi'ni uygulamaya başlayan Hindistan'ın önemli üniversitelerinden Jis College of Engineering Dünya Bankası'nın yönlendirmesiyle ikinci kez MEF Üniversitesi'ni ziyaret etti. Yapay zekanın eğitim-öğretimde kullanılması, derin öğrenme, mühendislik öğretiminde laboratuvarların kullanımı, mimarlık stüdyosu gibi MEF Üniversitesi'nin öğrenme alanlarında incelemelerde bulunan Jis College of Engineering yetkilileri MEF'in Flipped Learning uygulamaları hakkında detaylı bilgiler aldı.

Prof Anil Sahasrabudhe, Chairman, AICTE at our Flipped Classroom



International Symposium on Gen Next Initiatives for Digital India

The Symposium was initiated at the very onset with the theme of Digital India and the outcome was aimed at furnishing the various facets of Digital India movement and how that can impact us. The future lies in Digitization in teaching learning (to promote the idea of flipped learning/ blended learning) were one of the main aims of the symposium.



Endorsement from the world bank group

Our initiative of the Flipped Learning is now one year old and is proudly endorsed by the World Bank Group this year as the first maiden initiative of us for introducing Digital Pedagogy of flipped learning in India.

This April, the World Bank Group invited us – and we were the only entry from India – for its international webinar on *“Reversing the traditional learning environment: innovative pedagogical approaches in higher education”* so as to share our Indian experience on introducing the flipped learning for the first time in this country.

The Worldwide acceptance of our maiden effort

Following the World Bank Group webinar, we were invited to share our success story of the maiden Indian experience of introducing the Flipped Learning by a group of the Australian universities in July 2018. We did a lecture tour of several Australian Universities and notably among them were the University of Queensland, Brisbane, University of New South Wales, Sydney & Swinburne University, and Melbourne.

Planning for the International Conference on Digital Pedagogies on March02-03, 2019



International Conference on Digital Pedagogy to be held on March 2-3, 2019 in New Delhi. The event is co-convened by the Ministry of Human Resources and Development – MHRD, All India Council of Technical Education, the World Bank Group, the National Project Implementation Unit – NPIU of the TEQIP Project, the Department of Education of West Bengal and MAK University of Technology, Kolkata.

JIS College of Engineering of JIS Group, Kolkata, kindly has promoted the plans for the conference and it is serving as technical secretariat for the event, due to its leadership as the first higher education institution in India that has introduced flipped learning for its technology and business management programmes.

Eco-friendly Campus

We live today in an era of surplus in which consumer products flood the shelves, while the natural world around us is being depleted. Sustainable development refers to rational use of natural resources so as to preserve the planet as a life supporting habitat for future generations. Many complex environmental issues that relate to sustainability are at the center of the academic and social agenda.

Sustainability is a philosophy of life and a way of life that strives to enable everyone access to environmental, social and economic resources yet defends the rights of future generations as well. Every society has its special concept of sustainability linked to its traditions and environment. Therefore every group may enrich the ideas and activities of others. “Campus Greening“ is a concept which stands for the efforts to establish environmentally sustainable practices in educational institutions the world over. Its goal is to diminish the impact of ecological footprints by implementing the principles of sustainability at every level of institutional functioning.

The Environment and Education Club, JISCE, contributed, towards a green campus in its own unique way throughout the whole year.

On the celebration of Earth Day, 2017-18 a tree plantation program followed by a Seminar was organized to raise awareness about the importance of greenery to save our planet. In regard to this, trees were planted in the JISCE, Kalyani campus. We were honored to have Professor Debasish Das, HOD of Department of Environmental Science, Kalyani University as our chief guest in the seminar.



Tree plantation in JISCE campus



Seminar on “Everyday is Earth Day”

On the **World Environment Day, 2017** all the faculty members, staffs were requested to bring a sapling and donate to the Club. These saplings were planted at the college premises, as a part of our endeavour to make JIS College of Engineering a greener, better campus. The voluntary, enthusiastic participation of faculties and staffs of JIS College of Engineering made the event successful.



Dr. Sabyasachi Sen, HOD, Dept. Of Physics

Environment and Education club conducted Inter Departmental Eco Quiz Competition and Poster Competition on “Global Warming” in 2017. Since our club deals with environment concerns, the Quiz exclusively focused on environmental issues.



1st position: Koustav Das (EIE-1B)



The Quiz Master Mr. Subhrangshu Ray conducting the quiz

A campaign was to raise awareness about the importance of greenery to save our planet a tree plantation and distribution event called – Plant for the Planet organized by our club in 2014. Trees were planted in the college campus and distributed to the passerby in order to raise awareness. As a promise for a greener world, thumb prints were taken from all the participants, instead of a regular signature campaign. This was done in the form of a tree to keep with the spirit of the event.



The entire team

To convert the entire campus eco-friendly (green campus) by 2020 the following initiatives we have taken so far:

On Grid Solar Power Plant

The 5 KW_p Roof top SPV Power Plant is being set up in the college. Necessary instruments for the execution of the project have been installed. The various data of this SPV power plant is recorded and an analysis is on process. The inverter used is an isolated solar inverter which synchronizes the power from SPV plant with the existing grid. This inverter goes into an isolated state when the existing grid supply is cut off. The estimated energy that can be generated from this plant is calculated using the technical specifications of the modules, inverter and other equipments used in the project. A simulation model has been made using PVSYST, a SPV simulation software to get a loss analysis.

Objective of this Initiative

- i) To provide the power for the PEAK load by usual grid compensation with SPV.
- ii) Observation of Bus bars synchronization.
- iii) Estimation of annualize life cycle cost of this project for 20 years.
- iv) Estimation of carbon credit from the project.
- v) Estimation for modernization of West Bengal power plant with implementing SPV system to provide peak load demand.



5 kw on grid solar power plant at JIS College of Engineering Campus

Solar Tree & Solar Streetlights

Tree proves to be most beneficial source of energy. The **solar tree** blends art and solar energy technology in a sculptural expression. Solar trees are both artistic and functional clean energy machines. The term "solar tree" has been used to describe a variety of structures incorporating solar energy technology on a single pillar (like a tree trunk). Solar Tree implementation as alternate source of energy in urban cities. The installation of large solar collectors requires a very big space which is the main problem associated with tapping solar energy. This problem can be avoided by installing a Solar Tree requiring less space instead of a no of solar panels. To satisfy pressing environmental and social demands for urban lighting solar tree opens new prospects.



Natural Tree and Solar Tree

Solar trees deliver the following benefits:

- Build awareness and interest in solar technology, thereby promoting its adoption
- Provide shade and a meeting places
- Differentiate properties, especially those with other hidden green building measures

Photo-voltaic cells are arranged in Fibonacci series in place of leaves in solar tree which looks like an artificial tree. The amount of energy produced by solar tree is more than an array of solar cells. Solar Tree is made of metal structure and has solar panels at the top instead of branches of a real tree. Solar energy is collected by the solar panel and converted into electricity and used for batteries, charging of mobile phones, portable computers and tablets. The panels and lighting use this collected energy.

TREE Stands For:

- T** - Tree generating
- R** - Renewable
- E** - Energy and
- E** - Electricity

Solar Trees are efficient for capturing energy from sunlight and wind for producing energy as plants in nature.

Components of Solar Tree at JIS College of Engineering

The solar tree have following parts:

- Solar panels
- Long tower
- LEDs
- Batteries
- Stems for connecting the panels

Working of Solar Tree

Major problems of Power system are the storage of Electric energy. Output fluctuations of solar cell are eliminated by the day and night cycle or weather shifts. Solar tree panels can charge batteries during the day time. Solar trees automatically switches on its LED. The internal control can also regulate the amount of light produced. A sensor is used to measure the amount of light in atmosphere and triggers the solar lamps to switch ON automatically at sunset and OFF at sunset.



Solar TREE at JISCE



Solar street light at JISCE

Solid Waste Management

Waste management is the collection, transport, processing or disposal, managing and monitoring of waste materials. The term usually relates to materials produced by human activity, and the process is generally undertaken to reduce their effect on health, the environment or aesthetics. Waste management is a distinct practice from resource recovery which focuses on delaying the rate of consumption of natural resources.

All the waste from the JIS College campus is collected into waste bins marked as biodegradable and nonbiodegradable. Then all those wastes are collected into two vats separately by the cleaners. The waste then removed at a regular interval by Kalyani Municipality. Biodegradable materials such as fruit peels and tea and coffee grains are converted into manure in compost pits. Non-biodegradable materials such as paper and plastic waste are segregated and resold by the college.

Our environment and education club transfer the message “Reduce, reuse, and recycle” successfully especially at each semester’s beginning and end with active participation of students organizing special events, and involving local charitable organizations.

The kitchen waste of JISCE Canteen is utilized through Biogas generation.

Biogas Generation

Biogas is the gas produced by fermentation of organic matter (animal and vegetable) in the absence of oxygen and it is mainly composed of methane (CH_4).

Its production can take place from different ways:

Naturally :

- In moors and lakes, biogas is produced by the organic sediments accumulated at the bottom

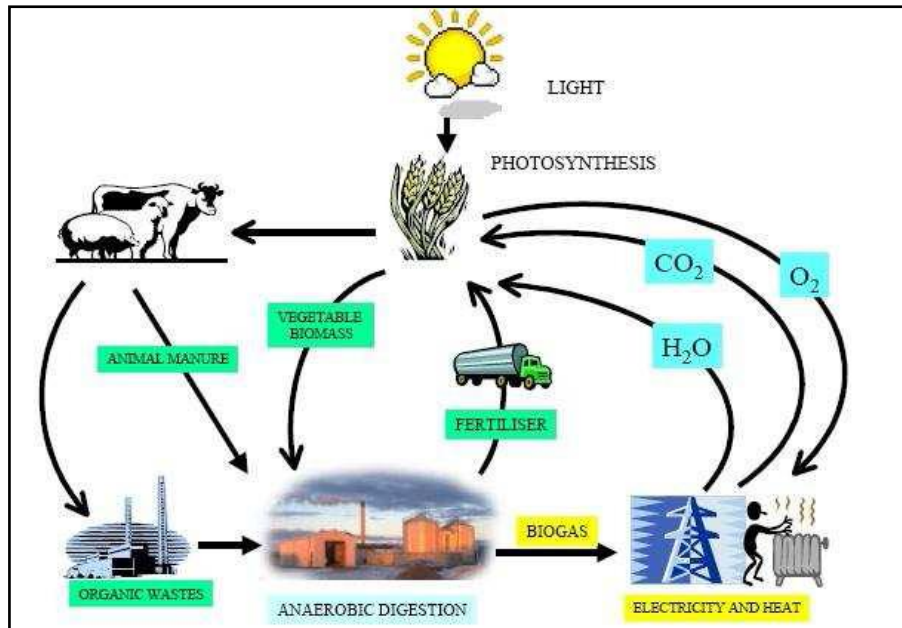
- In landfills which contains organic wastes

Artificially in anaerobic digesters, where it is heated, with :

- Sewage sludge
- Municipal waste (like food waste)
- Manure or dung in farms
- Energy crops (like maize silage)

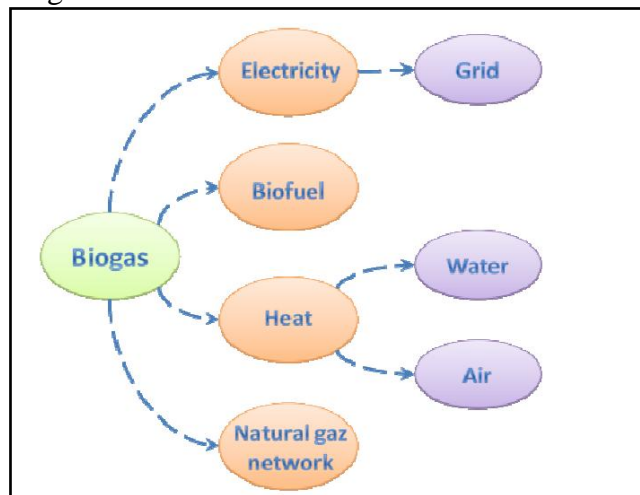
Biogas cycle

Like this, biogas can be called swamp, marsh, landfill or digester gas. The anaerobic digesters are usually called “biogas plant”. In fact, the composition of biogas is different depending on its origin: landfill gas typically has methane concentrations around 50 % contrary to some advanced waste treatment that can produce biogas with 55 to 75 % of methane.



Uses:

Biogas is renewable fuel that can be used to produce heat and electricity. Indeed, the gases methane, hydrogen and carbon dioxide can be combusted or oxidized with oxygen and that release some useful energy. Like this, biogas can be used for space heating, cooking, water heating and process heating.



Advantages:

Methane is a very powerful greenhouse gas: its global warming potential is 23 times higher than that of CO₂. In this way, recovering of biogas is very interesting to limit the greenhouse effect. Furthermore, biogas is a renewable energy form because biomass naturally releases biogas by decomposition. By using biogas as an energy source, we can reduce our dependency on fossil resources as coal, oil and natural gas.

Material Used:

1. Empty PVC tank 1000 ltrs capacity: 1 No. (to be used as Digester Tank)
2. Empty PVC tank 500 ltrs capacity: 1 no. (to be used as Gas Holder Tank) (Make sure the smaller can fits inside larger one and moves freely)
3. 110 mm dia. PVC pipe: (to be used for feeding waste material)
4. 70 mm dia. PVC pipe: (fixed inside gas holder tank as a guide pipe)
5. M-seal or any water-proof adhesive
6. Gas outlet system
7. A single burner bio-gas stove or a Bunsen Burner used in school laboratories

The Biogas generator:

This is floating type biogas generator consist of two PVC water buckets of 1000lt and 500lt capacity respectively (one bigger than the other), with the top of each bucket is cut open so that the smaller one can fit into the bigger bucket and move like a “telescope“. The bigger bucket (ordrum) serves as a digester, and the smaller, placed upside down inthe bigger one serves as the gas holder. The inlet flexible pipe, a bit longer than the height of the tank, is fitted at the bottom side ofthe bigger tank. The effluent outlet is fitted to the upper part of the bigger tank and determines the maximum level of matter in the tank. The gas outlet is fitted to the smaller inner tank and directed toward a gas stove.



Factors Affecting Yield and Production of Biogas

Many factors affecting the fermentation process of organic substances under anaerobic condition are,

- The quantity and nature of organic matter
- The temperature
- Acidity and alkanity (pH value) of substrate
- The flow and dilution of material

Comparison of conventional biogas and kitchen waste Biogas system:

Biogas systems are those that take organic material (feedstock) into an air-tight tank, where bacteria break down the material and release biogas, a mixture of mainly methane with some carbon dioxide. The biogas can be burned as a fuel, for cooking or other purposes, and the solid residue can be used as organic compost. Through this compact system, it has been demonstrated that by using feedstock having high calorific and nutritive value to microbes, the efficiency of methane generation can be increased by several orders of magnitude. It is an extremely user friendly system.

Comparison with Conventional Bio-Gas Plants	Conventional Bio-gas Systems	Kitchen Waste Bio-gas System
Amount of feedstock	40kg + 40ltr water	1.5-2 kg + 15 lit water
Nature of feedstock	Cow-Dung	Starchy & sugary material
Amount and nature of slurry to be disposed	80ltr, sludge	12ltr, watery
Reaction time for full utilization of feedstock	40 days	52 hours
Standard size to be installed	4,000 lit	1,000 lit
Operation	Skilled Person	Any Individual
Expenditure on Construction	Expensive	Cheap
Flame	Orange flame	Invisible Bluish Flame

Scope of the initiative:

According to our purpose of our project we were trying to design reactors of 1000 lit at the backside of administrative building, using kitchen waste directly as a feedstock and we have to calculate number of LPG cylinder we can save.

Calorific value of Biogas = 6 kWh/m³

Calorific value of LPG = 26.1 kWh/m³

Let us assume we need to boil water sample of 1000 gm per day on an average

We have Energy required to boil 100 gm water = 259.59 kJ

Hence, we need Biogas to boil 1000 gm water = 120.18 lit

And, we need LPG to boil 1000 gm water = 27.6 lit.

Therefore, amount of biogas which is produced = 120.18 lit/day

Now, amount of LPG required to boil 1000gm water per day = 27.6 lit So.

We can save up that much amount of LPG

Ecohandy Van & Solar E-rickshaw

The route of the proposed work commences with the planning phase involving feasibility study and initial research, followed by literature review and requirement analysis and gathering in the subsequent organizing phase.

Social equity by means of accessible, affordable and secure transportation choices for handicapped individual is a nucleus facet of endorsing sustainable transport services. A handicapped individual does not have to paddle the vehicle to traverse a protracted distance. Instead the ride would be an effortless and comfortable one, to say the least. Comfort echelon is optimum as there is a roof of the vehicle which would shield the individual from sunlight, rain and other natural predicament at bay.



Powered by an electric motor running on batteries, the modus operandi is apposite for a handicapped individual to traverse en route. In apiece battery charge, the vehicle could run for 80 kilometres at a speed of 15–20 kilometre/hour. The vehicle could be employed to carry goods from one place to another, as well. The said vehicle is cheap, simple and low maintenance vehicle. Eight models are designed for diverse upper and lower amputee handicapped patients having skeletal impairments, arthritis, cerebral palsy (cp), spinal cord injury, head injury (cerebral trauma), stroke (cerebral vascular accident - cva), loss of limbs or digits (amputation or congenital), Parkinson's disease, multiple sclerosis (ms), ALS (Lou Gehrig's disease), muscular dystrophy (md).

Current Status: Ongoing Successfully, Marketable, Patent filing done. Order of about 25 pieces has been received from NGOs. Leading Battery Company "EXIDE" wants to tie-up to sponsor the tires of the vehicle.



Fig. 7: SOLAR 'e-rickshaw' developed by JIS College of Engineering