Yashoda Shikshan Prasarak Mandal's
YASHODA TECHNICAL CAMPUS, SATARA
NH-4, Wadhe Phata, Satara. Tele Fax- 02162-271238/39/40
Website- www.yes.edu.in, Email-registrar_ytc@yes.edu.in
Approved by AICTE / PCI New Delhi, Govt. of Maharashtra (DTE, Mumbai)
Affiliated to DBATU Lonere & Shivaji University, Kolhapur/ MSBTE, Mumbai.
NAAC B+ **Institute Code – 6757**

Prof. Dasharath Sagare	Prof. Ajinkya Sagare	Dr. Vivekkumar Redasani
Founder, President	Vice-President	Director

NAAC SSR II CYCLE
DVV

Criterion VII

7.1.3 Quality audits on environment and energy regularly undertaken by the Institution. The institutional environment and energy initiatives are confirmed through the following

1. Green audit / Environment audit
2. Energy audit
3. Clean and green campus initiatives
4. Beyond the campus environmental promotion activities

Sr. No.	Findings of DVV	Response of HEI
1	HEI is requested to provide certificate from the external accredited auditing agency (preferably government, concern department of affiliating university).	As per the requirement, the certificate from the external accredited auditing agency is attached.
2	Kindly provide Geo tagged photographs with caption and date.	As per the requirement, the geo tagged photographs for the chosen options with proper caption and date are attached as per the available actual site conditions.
3	Kindly provide report of energy usage audit.	As per the requirement, the reports of energy usage audit for last five years is attached.
4	Kindly provide Any other supporting document for beyond the campus environmental promotions.	As per the requirement, available relevant documents attached for beyond the campus environmental promotions.
5	Kindly provide any other relevant proof for the selected options.	As per the requirement, available relevant proof documents attached for the selected options.

HEI Input:
A. All of the above

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QM No.	QM NAME	Page No.
	7.1 Institutional Values and Social Responsibilities	
7.1.3	The institutional environment and energy initiatives 1. Green audit / Environment audit certificate. 2. Geo tagged photographs with caption and date. 3. Report of energy usage audit. 4. Beyond the campus environmental promotion activities proofs.	4-170

INDEX

YASHODA TECHNICAL CAMPUS 6757 SATARA
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Ph No. +91-9970015551
Office: Wadhe-phata, Satara
GSTIN: 27AADFO3115R1ZS

O3 Spaces

Date: 26th July 2021

CERTIFICATE

This is to certify that we have conducted Environmental and Green Audit at **Yashoda Shikshan Prasarak Mandal, Satara in the A.Y.- 2020-21**
The College has adopted following Energy Efficient sustainable practices:

- Usage of Energy Efficient LED Fittings
- Maximum usage of Day Lighting
- Installation of Roof Top Solar Hot Water System
- Installation of Roof Top Solar PV Plant
- Green Campus
- Waste Segregation
- Rain Water Harvesting System

We appreciate the support of Management, involvement of faculty members and students in the process of making the Campus Energy Efficient.

SWARALI SAGARE & ASSOCIATES CA/2016/78998 ARCHITECT SATARA

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7.1.3 - The institutional initiatives for greening the campus are as follows:

Fig. 7.1.3.1. Pedestrian-friendly pathway

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Fig. 7.1.3.2. Landscaping in the YTC campus

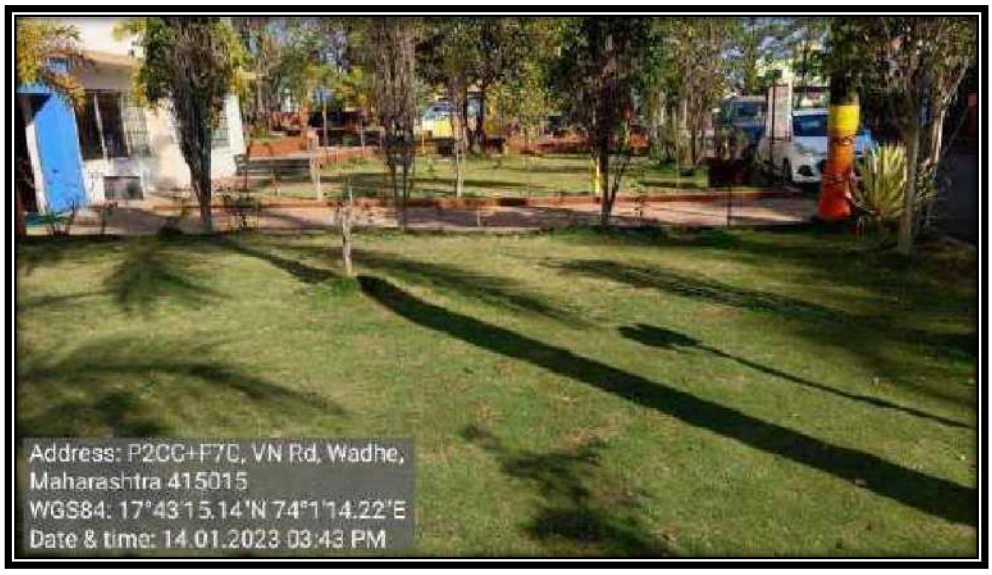

Fig. 7.1.3.3. Landscaping in the YTC campus

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Fig. 7.1.3.4. Landscaping in the YTC campus

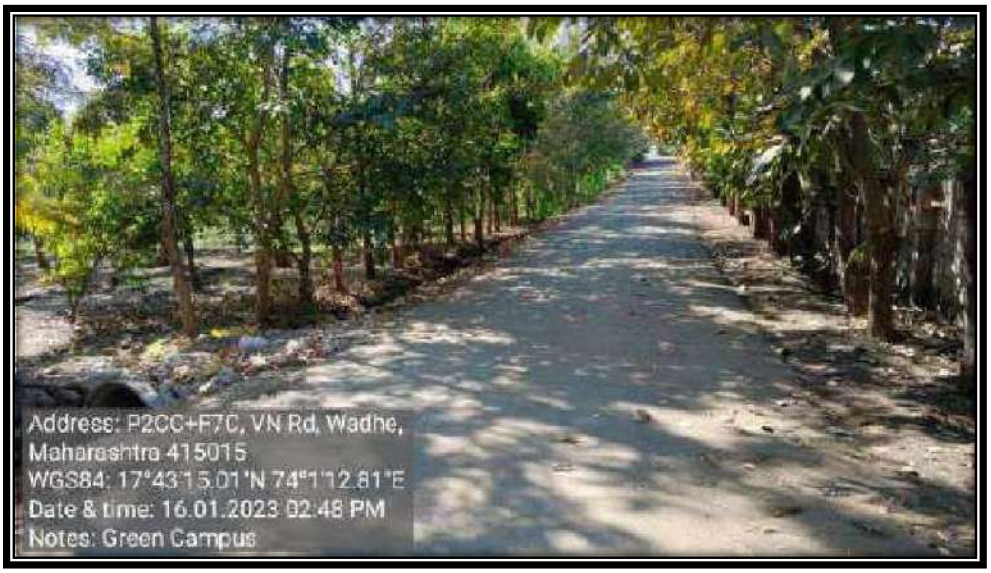

Fig. 7.1.3.5. Landscaping in the YTC campus

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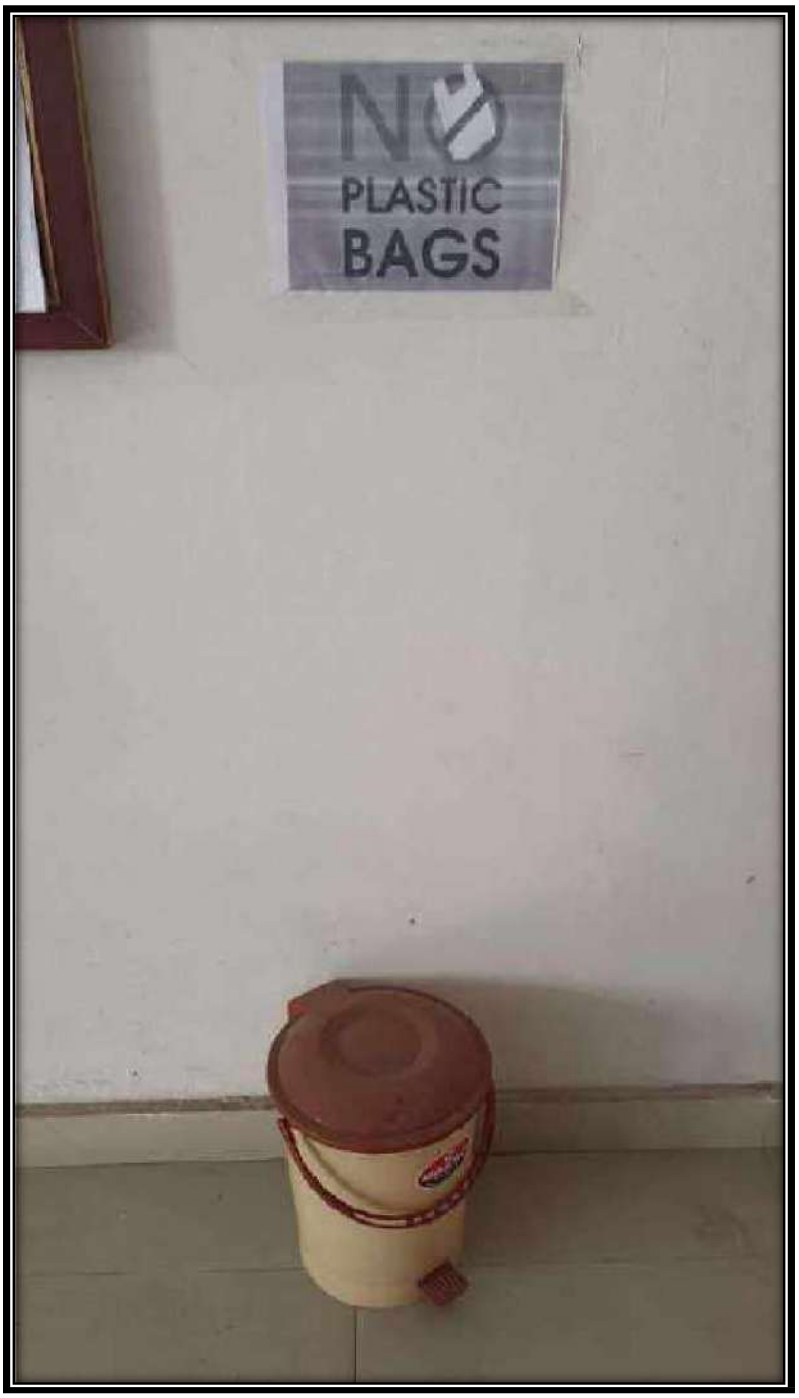

Fig. 7.1.3.6. Ban on use of plastic

7.1.3 - Water conservation facilities available in the Institution: Rain water harvesting Bore well /Open well recharge Construction of tanks and bunds Waste water recycling Maintenance of water bodies and distribution system in the campus.

Yashoda Technical Campus is having rain water harvesting system. In this system, rain water is channelized via drain pipes which are subsequent linked to centralized pipe which carry water to central pit. The central pit is linked to water harvesting gadget plant is used to irrigation of colleges agriculture field near girl's hostel.

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Satara

7.1.3 Rain water harvesting Bore well /Open well recharge Construction

Fig. 7.1.3.7. Rainwater harvesting

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Fig. 7.1.3.8. Bore well

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7.1.3 - THE INSTITUTION HAS FACILITIES FOR ALTERNATE SOURCES OF ENERGY AND ENERGY CONSERVATION MEASURES.

Solar Power Plant: 67 KWP

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Solar energy is a clean and renewable alternative to fossil fuels because it is environmentally friendly, pollution-free, virtually inexhaustible, safe, and efficient. It is compatible with smart technology and education. It's an ideal energy source for powering cost-effective and environmentally friendly facilities that serve thousands of people.

Yashoda Technical Campus has installed a 67 KWP solar plant as an alternative energy resource. The use of LED bulbs as energy-efficient equipment that consumes less electricity also contributes to lowering consumption.

For Solid waste, liquid waste and Biological waste management, biogas plant of two cubic meter capacity is installed in the campus. Students and faculty of department of Civil engineering have innovatively designed biogas plant. The plant operates on Hostel, canteen waste and the biogas generated is used for power the canteen kitchen. Organic waste generated from garden is converted into compost, instead of burning. It is further used as fertilizer for garden.

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7.1.3 - THE INSTITUTION HAS FACILITIES FOR ALTERNATE SOURCES OF ENERGY AND ENERGY CONSERVATION MEASURES.

Fig. 7.1.3.9. Solar Energy Panel

Fig. 7.1.3.10. Solar Heater

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Fig. 7.1.3.11. Biogas plant

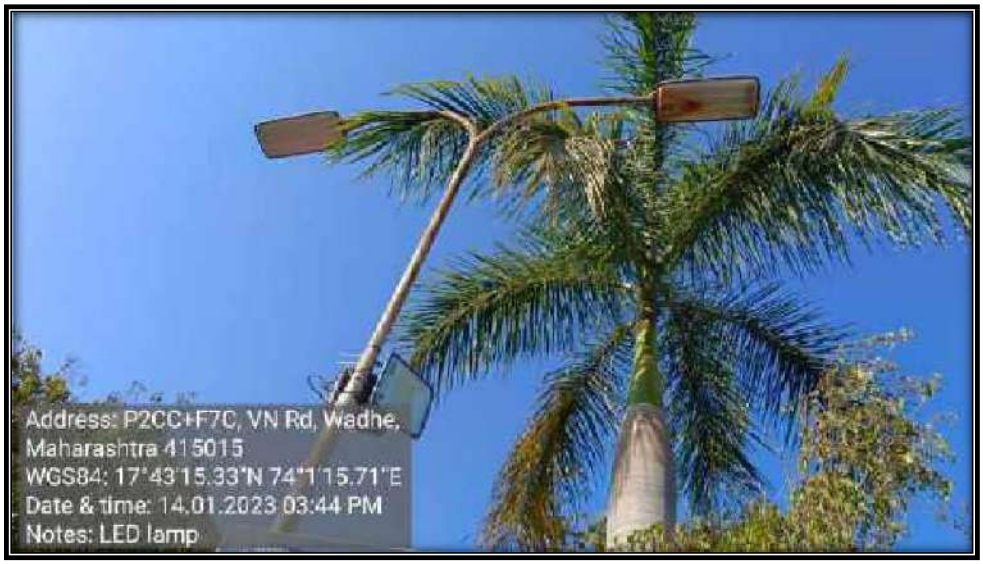

Fig. 7.1.3.12. Use of LED bulbs

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Satara

7.1.3 - Solid waste management Liquid waste management biomedical waste management E-waste management Waste recycling system Hazardous chemicals and radioactive waste management.

Fig. 7.1.3.13. Biogas plant

Fig. 7.1.3.14. Degradable and non-degradab

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Satara

ENERGY AUDIT REPORT

Faculty of Engineering Yashoda Technical Campus

Wadhe, Satara

2022-23

CONDUCTED BY:

Department of Electrical Engineering
Faculty of Engineering, YTC, Satara

Table of Content

Table of Content

EXECUTIVE SUMMARY

The assignment was conducted and the following areas have been covered in the study:

- Electricity Bill
- Distribution Network
- DG Sets
- Lights
- Air Conditioning Load
- Solar Power, etc.

The summary of the observations and recommendations from the energy management study of the college building is given below:

The Running Maximum Demand (kVA) of the college varies monthly. The power factor also varies, affecting the demand and billing. Details of Power Factor are provided in the report.

A STATUS OF THE COLLEGE BUILDING

A.1 General

Yashoda Technical Campus Faculty of Engineering is affiliated with Dr. Babasaheb Ambedkar Technological University Lonere, established in 2011. It offers higher education in Engineering and Technology and is located on the outskirts of Satara city.

A.2 Energy Sources

Electricity is the major energy source of the college, supplied by MSEDCL Maharashtra. Diesel fuel is used in the DG set for in-house electricity generation during power cuts. Solar power station of 67kW capacity is installed.

A.3 Energy Consumption

The applicable electrical tariff consists of a fixed cost (Demand Charges) and unit (kWh) rate. The average monthly unit consumption and electricity bill amount for the last 12 months are provided below:

BILLING HISTORY			
Bill Month	**Units**	**Bill Demand(KVA)**	**Bill Amount**
APR-23	12,739	88	2,19,183
MAR-23	10,958	81	1,90,108
FEB-23	9,853	81	1,75,508
JAN-23	8,865	81	1,62,465
DEC-22	9,714	81	1,74,442
NOV-22	7,426	81	1,44,348
OCT-22	7,211	81	1,40,502
SEP-22	8,074	81	1,52,115
AUG-22	12,190	81	2,10,121
JUL-22	10,495	81	1,87,088
JUN-22	12,310	81	2,11,537
MAY-22	14,907	81	2,20,512

A.4 DG Sets

There is one DG set of 82 kVA capacity installed in the college. Due to minimal power cuts, the running hours of the DG set are very limited.

A.5 Air Conditioning

The college has various air-conditioning units to maintain comfort temperature in the offices and classrooms.

SECTION 1: Electrical Supply & Billings

1.1 ELECTRICAL SUPPLY

The college receives electrical supply from MSEDCL Maharashtra. One energy meter and a transformer of 11 kV/ 433 V, 990 kVA capacity are installed.

1.2 SANCTIONED DEMAND

The sanctioned demand for the college is 198.6 kW. The running maximum demand and fixed cost from the electricity bill are detailed below:

Bill Month	Sanctioned Demand (kVA)	Running Max. Demand (kVA)	Fixed Cost (Rs)
April 2023	88	88	2,19,183
March 2023	81	81	1,90,108
February 2023	81	81	1,75,508
January 2023	81	81	1,62,465
December 2022	81	81	1,74,442
November2022	81	81	1,44,348
October 2022	81	81	1,40,502
September2022	81	81	1,52,115
August 2022	81	81	2,10,121
July 2022	81	81	1,87,088
June 2022	81	81	2,11,537
May 2022	81	81	2,20,512

1.3 POWER FACTOR

The power factor for the college varies monthly, impacting the billing and demand charges. Improvements in the power factor could result in significant cost savings.

1.4 DISTRIBUTION NETWORK

The main electrical panel and distribution cables are adequate, with no signs of overheating or insulation damage, ensuring minimal distribution losses.

1.5 DG SETS

An energy meter should be installed on the DG set to monitor its efficiency, unit generation, and diesel consumption.

1.6. SAVING IN COST CALCULATION. Given Data from

Energy Bill

Item	Value
Current Sanctioned Demand	125 kVA
Actual Demand	88 kVA
Current Demand Charges	₹43,912

Calculation Details

Calculation Step	Value
Rate per kVA	₹499 per kVA
Reduced Sanctioned Demand (Example)	80 kVA
New Demand Charges for 80 kVA	₹39,920
Monthly Cost Savings	₹3,992
Total Cost of Demand Controller	₹40,000
Simple Payback Period	10 months

Summary Table

Item	Amount
Current Sanctioned Demand	125 kVA
Actual Demand	88 kVA
Current Demand Charges	₹43,912
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Monthly Cost Savings	₹3,992
Total Cost of Demand Controller	₹40,000
Simple Payback Period	10 months

USE OF ELECTRICITY DURING PEAK HOUR AND OFF-PEAK HOUR

The applicable electricity tariff is not also based on timing of the day but it may not be applicable in case of domestic LT/ HT type connection. This will also helpful in maintaining the demand graph. It is recommended to avoid use of electrical gadget for cleaning, watering etc. during the peak hours. This type of work should be operational during the off peak hour.

1.7 POWER FACTOR

Parameter	Before APFC Panel	After APFC Panel
Power Factor	0.949	0.99
Sanctioned kVA	125	125
Maximum Demand (kW)	88	88
Reactive Power (kVAR)	88.9	17.625
Energy Charges (for estimation)	Rs. 1,91,276.80	Rs. 1,91,276.80
Time	1 month (720 hours)	1 month (720 hours)
Rate	Rs. 10.40 per kVAR-hour	Rs. 10.40 per kVAR-hour
Reactive Energy Charges Estimate	Rs. 65,538.24	
Estimated Cost Savings	- Rs. 12,222.48	

1.8 DISTRIBUTION NETWORK

There is a main electrical panel installed near the DG Set. All the distribution cables are going from the main panel to all the buildings, submersible pump, street light etc. Sub panels are installed in the buildings. There is a taping on each floor from the raising mains.

During the study, it was observed that the conductor size is good according to ampere load. No any conductor was found over heated or its insulation burnt. Adequate size of conductor is going to feed the utility area. So, distribution losses are within the limit.

1.9 D G SETS

There is a DG set available in the college of capacity 82 kVA for in house generation of electricity. As the power supply is very good in the area so the running hour of DG set is very less.

It is advisable to put an energy meter on each DG set then it would be easy to conduct the efficiency of DG set. This way, the operator could also note down the unit generation and oil consumed. The operator may record the operating parameters of the sets in the following manner i

The mechanical details like temperature, lube oil etc. should be in addition to the above. From the above data, the management may calculate the offices generated by the DG set in an hour and total diesel consumption. The offices generated per litre of diesel consumed can hence be calculated on an hourly basis. Thereafter, the monthly figures can be calculated in the similar fashion.

It may be noted that the efficiency of the DG set depends largely on the operating load factor.

The maximum efficiency of the DG set is available at about 80-85% load factor.

SECTION 2 Lights, Air-condition & Solar PV

2.1 LIGHTING

The total lighting (luminary) load of the college is about 8 kW which includes Fluorescent tubes 36w/ 40w, LED lights 12w/ 36w etc. LED lights is good from energy efficiency point of view.

LED tube lights are also available in the market, which is also good from energy efficiency point of view. Whenever 36/40w tube gets fuse (not in warranty period) then it could be replaced by 18w/ 9w LED tube. There are 20 nos of street lights which are working on solar power with battery. These lights are switched ON in the night with the help of timer.

During study, tube lights were ON in the class room and it was observed that lux level was good (240 – 320) in the class room near to window. But Lux level was down (120 – 200) near the entrance door and its wall side. It is advisable to increase some tube lights in the class room for better lux value.

2.2 Air Conditioning Load

In the Unit/ college, there are package unit of 6 x 10TR, 4 x 8.5 TR, 8 nos of cassette unit (5 x 2TR, 3 x 3TR) and 15 nos of 2 TR split units Air-conditioners to maintain comfort temperature in the Auditorium/ office etc. Package units are installed mainly for the Auditorium.

Due to the study being done in winters, the Energy efficiency assessment could not be done for the ACs. However, it was observed that some split ACs fitted in the office carries 5 star, which is good from energy efficiency point of view. It is recommended that whenever new split/ window ACs are being installed, it should be 5 star rated. Filters of package units were also checked during study which was found very clean.

Energy Consumption in star rated split office is given above for information.

S.No.	Type of Ac	Rated TR	Star	KW
1	Split	1.5	*	1.91 - 2.1
2	Split	1.5	**	1.75 - 1.9
3	Split	1.5	***	1.65 - 1.74
4	Split	1.5	****	1.55 - 1.64
5	Split	1.5	*****	1.45 - 1.54

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Yashoda Technical Campus
Satara

Star rated window ACs are also available in the market. It also consumes similar power as there in split office. Proper cleaning of ACs are very important for its output performance. At least, once in two months cleaning of ACs filter is recommended during the season.

2.3 SOLAR POWER GENERATION

There is a Solar Photovoltaic (SPV) unit for Power Generation with capacity 67 kW. The SPV is connected with the LT supply with some relay/sensor which keeps senses of electrical supply. When there is electrical supply, the SPV will generate electricity. As the electrical supply goes off, the SPV will not generate any electricity. SPV will also not generate electricity when there is electrical supply of DG set.

The best use of SPV is to put all lighting, exhaust fan load, fan load etc. on it. Some intelligent relay/ sensor need to install for better management. The energy meter should also be calibrated by third party once in a year or two years. This way, the SPV will continue supply even there is utility supply available or not and it will also help in saving a substantial amount in the electricity bill. It was also observed that electrical data like daily/ weekly/ monthly units generated by SPV are not recorded in the register or in soft copy.

The SPV system should be installed along with Net metering system. For this, there is a proper format in the concerned MSEDCL, MAHARASHTRA office to install Net metering. Benefits of net metering is given below:

Advantage of Net Metering

1. Financial benefit for the system owner

Since the system owner is charged for the net energy consumed from the utility grid, the owner gets financial benefits. Eg. If energy generation < energy consumed: owner pays just for the net amount. If energy generation > energy consumed: the owner gets credit for excess generation.

2. Avoid the use of batteries

In a grid connected solar pv system, any excess energy generated can be fed back to local utility grid and can be taken back at later stage when required. Thus, there is no need to store the surplus energy in batteries for later use, thus, avoiding the heavy costs of batteries. Also, since batteries are eliminated, the maintenance costs of the system also reduce to a great extent. Batteries may be required only when there are frequent power fluctuations/outages.

3. Produce more today, use that tomorrow

If there is a surplus of power generation than the consumption, the surplus can be fed into grid system and if consumption increases, it can be taken from the grid.

YASHODA TECHNICAL CAMPUS 6757 SATARA

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General Energy Conservation Tips

Electricity

- Schedule your operations to maintain a high load factor
- Minimize maximum demand by tripping loads through a demand controller
- Use standby electric generation equipment for on-peak high load periods.
- Correct power factor to at least 0.99 under rated load conditions.
- Set transformer taps to optimum settings.
- Shut off unnecessary computers, printers, and copiers at night.

Motors

- Properly size to the load for optimum efficiency.
- (High efficiency motors offer of 4 - 5% higher efficiency than standard motors)
- Check alignment.
- Provide proper ventilation
- (For every 10°C increase in motor operating temperature over recommended peak, the motor life is estimated to be halved)□Check for under-voltage and over-voltage conditions.
- Balance the three-phase power supply.
- (An Imbalanced voltage can reduce 3 - 5% in motor input power)
- Demand efficiency restoration after motor rewinding.

Fans

- Use smooth, well-rounded air inlet cones for fan air intakes.
- Avoid poor flow distribution at the fan inlet.
- Minimize fan inlet and outlet obstructions.
- Clean screens, filters, and fan blades regularly.
- Use aerofoil-shaped fan blades.
- Minimize fan speed.
- Use low-slip or flat belts.
- Check belt tension regularly.
- Eliminate variable pitch pulleys.
- Use variable speed drives for large variable fan loads.
- Use energy-efficient motors for continuous or near-continuous operation
- Eliminate leaks in ductwork.

- Minimize bends in ductwork
- Turn fans off when not needed.

Blowers

- Use smooth, well-rounded air inlet ducts or cones for air intakes.
- Minimize blower inlet and outlet obstructions.
- Clean screens and filters regularly.
- Minimize blower speed.
- Use low-slip or no-slip belts.
- Check belt tension regularly.
- Eliminate variable pitch pulleys.
- Use variable speed drives for large variable blower loads.
- Use energy-efficient motors for continuous or near-continuous operation.
- Eliminate ductwork leaks.
- Turn blowers off when they are not needed.

Pumps

- Operate pumping near best efficiency point.
- Modify pumping to minimize throttling.
- Adapt to wide load variation with variable speed drives or sequenced control of smaller offices.
- Stop running both pumps -- add an auto-start for an on-line spare or add a booster pump in the problem area.
- Use booster pumps for small loads requiring higher pressures.
- Increase fluid temperature differentials to reduce pumping rates.
- Repair seals and packing to minimize water waste.

Balance the system to minimize flows and reduce pump power requirements.

- Use siphon effect to advantage: don't waste pumping head with a free-fall (gravity) return.

Chillers

- Increase the chilled water temperature set point if possible.
- Use the lowest temperature condenser water available that the chiller can handle.
- (Reducing condensing temperature by 5.5°C, results in a 20 - 25% decrease in compressor power consumption)
- Increase the evaporator temperature
- (5.5°C increase in evaporator temperature reduces compressor power consumption by 20 - 25%)
- Clean heat exchangers when fouled.
- (1 mm scale build-up on condenser tubes can increase energy consumption by 40%)
- Optimize condenser water flow rate and refrigerated water flow rate.
- Use water-cooled rather than air-cooled chiller condensers.
- Use energy-efficient motors for continuous or near-continuous operation.
- Specify appropriate fouling factors for condensers.
- Do not overcharge oil.
- Install a control system to coordinate multiple chillers.
- Study part-load characteristics and cycling costs to determine the most-efficient mode for operating multiple chillers.
- Run the chillers with the lowest operating costs to serve base load.
- Avoid over sizing - match the connected load.
- Isolate off-line chillers and cooling towers.
- Establish a chillers efficiency-maintenance program. Start with an energy audit and follow-up, then make a chillers efficiency-maintenance program a part of your continuous energy management program.

HVAC (Heating / Ventilation / Air Conditioning)

Tune up the HVAC control system.

- Consider installing a building automation system (BAS) or energy management system (EMS) or restoring an out-of-service one.
- Balance the system to minimize flows and reduce blower/fan/pump power requirements.
- Eliminate or reduce reheat whenever possible.

- Use appropriate HVAC thermostat setback.
- Use building thermal lag to minimize HVAC equipment operating time.
- In winter during unoccupied periods, allow temperatures to fall as low as possible without freezing water lines or damaging stored materials.
- In summer during unoccupied periods, allow temperatures to rise as high as possible without damaging stored materials.
- Improve control and utilization of outside air.
- Use air-to-air heat exchangers to reduce energy requirements for heating and cooling of outside air.
- Reduce HVAC system operating hours (e.g. -- night, weekend).
- Optimize ventilation.
- Ventilate only when necessary. To allow some areas to be shut down when unoccupied, install dedicated HVAC systems on continuous loads (e.g. -- computer rooms).
- Provide dedicated outside air supply to kitchens, cleaning rooms, combustion equipment, etc. to avoid excessive exhausting of conditioned air.
- Use evaporative cooling in dry climates.
- Clean HVAC office coils periodically and comb mashed fins.
- Upgrade filter banks to reduce pressure drop and thus lower fan power requirements.
- Check HVAC filters on a schedule (at least monthly) and clean/change if appropriate.

  Check pneumatic controls air compressors for proper operation, cycling, and maintenance.
- Isolate air-conditioned loading dock areas and cool storage areas using highspeed doors or clear PVC strip curtains.
- Install ceiling fans to minimize thermal stratification in high-bay areas.
- Relocate air diffusers to optimum heights in areas with high ceilings.
- Consider reducing ceiling heights.
- Eliminate obstructions in front of radiators, baseboard heaters, etc.
- Check reflectors on infrared heaters for cleanliness and proper beam direction.
- Use professionally-designed industrial ventilation hoods for dust and vapor control.
- Use local infrared heat for personnel rather than heating the entire area.
- Use spot cooling and heating (e.g. -- use ceiling fans for personnel rather than cooling the entire area).
- Purchase only high-efficiency models for HVAC offices.
- Put HVAC window offices on timer control.

- Don't oversize cooling offices. (Oversized offices will "short cycle" which results in poor humidity control.)
- Install multi-fueling capability and run with the cheapest fuel available at the time.
- Consider dedicated make-up air for exhaust hoods. (Why exhaust the air conditioning or heat if you don't need to?) Minimize HVAC fan speeds.
- Consider desiccant drying of outside air to reduce cooling requirements in humid climates.
- Seal leaky HVAC ductwork.
- Seal all leaks around coils.
- Repair loose or damaged flexible connections (including those under air handling offices).
- Eliminate simultaneous heating and cooling during seasonal transition periods.
- Zone HVAC air and water systems to minimize energy use.
- Inspect, clean, lubricate, and adjust damper blades and linkages.
- Establish an HVAC efficiency-maintenance program. Start with an energy audit and follow-up, then make an HVAC efficiency-maintenance program a part of your continuous energy management program.

Lighting

- Reduce excessive illumination levels to standard levels using switching; delamping, etc. (Know the electrical effects before doing de-lamping.)
- Aggressively control lighting with clock timers, delay timers, photocells, and/or occupancy sensors.
- Install efficient alternatives to incandescent lighting, mercury vapour lighting, etc. Efficiency (lumens/watt) of various technologies range from best to worst approximately as follows: low pressure sodium, high-pressure sodium, metal halide, fluorescent, mercury vapour, incandescent.
- Select ballasts and lamps carefully with high power factor and long-term efficiency in mind.
- Upgrade obsolete fluorescent systems to Compact fluorescents and electronic ballasts
- Consider lowering the fixtures to enable using less of them.
- Consider day lighting, sky lights, etc.
- Consider painting the walls a lighter colour and using less lighting fixtures or lower wattages.
- Use task lighting and reduce background illumination.
- Re-evaluate exterior lighting strategy, type, and control. Control it aggressively.
- Change exit signs from incandescent to LED.

DG sets

- Optimize loading
- Use waste heat to generate steam/hot water /power an absorption chiller or preheat process or utility feeds.
- Use jacket and head cooling water for process needs

  Clean air filters regularly

  Insulate exhaust pipes to reduce DG set room temperatures Use cheaper heavy fuel oil for capacities more than 1MW

Buildings

- Seal exterior cracks / openings / gaps with caulk, gasketing, weather stripping, etc.
- Consider new thermal doors, thermal windows, roofing insulation, etc.
- Install windbreaks near exterior doors.
- Replace single-pane glass with insulating glass.
- Consider covering some window and skylight areas with insulated wall panels inside the building.
- If visibility is not required but light is required, consider replacing exterior windows with insulated glass block.
- Consider tinted glass, reflective glass, coatings, awnings, overhangs, draperies, blinds, and shades for sunlit exterior windows.
- Use landscaping to advantage.
- Add vestibules or revolving doors to primary exterior personnel doors.
- Consider automatic doors, air curtains, strip doors, etc. at high-traffic passages between conditioned and non-conditioned spaces. Use self-closing doors if possible.
- Use intermediate doors in stairways and vertical passages to minimize building stack effect.
- Use dock seals at shipping and receiving doors.
- Bring cleaning personnel in during the working day or as soon after as possible to minimize lighting and HVAC costs.

Water & Wastewater

- Recycle water, particularly for uses with less-critical quality requirements.
- Recycle water, especially if sewer costs are based on water consumption.
- Balance closed systems to minimize flows and reduce pump power requirements.

  Eliminate once-through cooling with water.

Use the least expensive type of water that will satisfy the requirement.

Fix water leaks.

- Test for underground water leaks. (It's easy to do over a holiday shutdown.) Check water overflow pipes for proper operating level.
- Automate blow down to minimize it.
- Provide proper tools for wash down -- especially self-closing nozzles.
- Install efficient irrigation.
- Reduce flows at water sampling stations.
- Eliminate continuous overflow at water tanks.
- Promptly repair leaking toilets and faucets.
- Use water restrictors on faucets, showers, etc.
- Use self-closing type faucets in restrooms.
- Use the lowest possible hot water temperature.
- Do not use a heating system hot water boiler to provide service hot water during the cooling season -- install a smaller, more-efficient system for the cooling season service hot water.
- If water must be heated electrically, consider accumulation in a large insulated storage tank to minimize heating at on-peak electric rates.
- Use multiple, distributed, small water heaters to minimize thermal losses in large piping systems.
- Use freeze protection valves rather than manual bleeding of lines.
- Consider leased and mobile water treatment systems, especially for deionized water.
- Seal sumps to prevent seepage inward from necessitating extra sump pump operation.
- Install pre-treatment to reduce TOC and BOD surcharges.
- Verify the water meter readings. (You'd be amazed how long a meter reading can be estimated after the meter breaks or the meter pit fills with water!)
- Verify the sewer flows if the sewer bills are based on them

Miscellaneous

- Meter any unmetered utilities to know what normal efficient use is. Track down causes of deviations.
- Shut down spare, idling, or unneeded equipment.
- Make sure that all of the utilities to redundant areas are turned off -- including utilities like compressed air and cooling water.
- Install automatic control to efficiently coordinate multiple air compressors, chillers, cooling tower cells, boilers, etc.
- Renegotiate utilities contracts to reflect current loads and variations.
- Consider buying utilities from neighbours, particularly to handle peaks.
- Leased space often has low-bid inefficient equipment. Consider upgrades if your lease will continue for several more years.
- Adjust fluid temperatures within acceptable limits to minimize undesirable heat transfer in long pipelines.
- Minimize use of flow bypasses and minimize bypass flow rates.
- Provide restriction orifices in purges (nitrogen, steam, etc.).
- Eliminate unnecessary flow measurement orifices.
- Consider alternatives to high-pressure drops across valves.
- Turn off winter heat tracing that is on in summer.

ENERGY AUDIT REPORT

Faculty of Engineering Yashoda Technical Campus

Wadhe, Satara

2021-22

CONDUCTED BY:

Department of Electrical Engineering
Faculty of Engineering, YTC, Satara

YASHODA TECHNICAL CAMPUS 6757 SATARA

YASHODA TECHNICAL CAMPUS 6757 SATARA

DIRECTOR
Yashoda Technical Campus
Satara

Table of Content

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EXECUTIVE SUMMARY

The assignment was conducted and the following areas have been covered in the study:

- Electricity Bill
- Distribution Network
- DG Sets
- Lights
- Air Conditioning Load
- Solar Power, etc.

The summary of the observations and recommendations from the energy management study of the college building is given below:

The Running Maximum Demand (kVA) of the college varies monthly. The power factor also varies, affecting the demand and billing. Details of Power Factor are provided in the report.

A STATUS OF THE COLLEGE BUILDING

A.1 General

Yashoda Technical Campus Faculty of Engineering is affiliated with Dr. Babasaheb Ambedkar Technological University Lonere, established in 2011. It offers higher education in Engineering and Technology and is located on the outskirts of Satara city.

A.2 Energy Sources

Electricity is the major energy source of the college, supplied by MSEDCL Maharashtra. Diesel fuel is used in the DG set for in-house electricity generation during power cuts. Solar power station of 67kW capacity is installed.

A.3 Energy Consumption

The applicable electrical tariff consists of a fixed cost (Demand Charges) and unit (kWh) rate. The average monthly unit consumption and electricity bill amount for the last 12 months are provided below:

BILLING HISTORY			
Bill Month	**Units**	**Bill Demand(KVA)**	**Bill Amount**
APR-22	13,535	81	2,04,366
MAR-22	13,743	75	2,06,832
FEB-22	10,969	75	1,70,726
JAN-22	12,382	75	1,85,917
DEC-21	13,393	75	1,98,117
NOV-21	10,942	75	1,68,699
OCT-21	11,811	75	1,78,634
SEP-21	9,670	75	1,54,016
AUG-21	9,152	75	1,47,983
JUL-21	9,430	75	1,51,541
JUN-21	7,923	75	1,33,246
MAY-21	8,399	75	1,38,437

A.4 DG Sets

There is one DG set of 82 kVA capacity installed in the college. Due to minimal power cuts, the running hours of the DG set are very limited.

A.5 Air Conditioning

The college has various air-conditioning units to maintain comfort temperature in the offices and classrooms.

YASHODA TECHNICAL CAMPUS 6757 SATARA

DIRECTOR
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SECTION 1: Electrical Supply & Billings

1.1 ELECTRICAL SUPPLY

The college receives electrical supply from MSEDCL Maharashtra. One energy meter and a transformer of 11 kV/ 433 V, 990 kVA capacity are installed.

1.2 SANCTIONED DEMAND

The sanctioned demand for the college is 198.6 kW. The running maximum demand and fixed cost from the electricity bill are detailed below:

Bill Month	Sanctioned Demand (kVA)	Running Max. Demand (kVA)	Fixed Cost (Rs)
APR-22	125	81	2,04,366
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1.3 POWER FACTOR

The power factor for the college varies monthly, impacting the billing and demand charges. Improvements in the power factor could result in significant cost savings.

1.4 DISTRIBUTION NETWORK

The main electrical panel and distribution cables are adequate, with no signs of overheating or insulation damage, ensuring minimal distribution losses.

1.5 DG SETS

An energy meter should be installed on the DG set to monitor its efficiency, unit generation, and diesel consumption.

1.6. SAVING IN COST CALCULATION. Given Data from

Energy Bill

Item	Value
Current Sanctioned Demand	125 kVA
Actual Demand	81 kVA
Current Demand Charges	₹ 36,774.00

Calculation Details

Calculation Step	Value
Rate per kVA	₹454 per kVA
Reduced Sanctioned Demand (Example)	80 kVA
New Demand Charges for 80 kVA	₹36,320
Monthly Cost Savings	₹454
Total Cost of Demand Controller	₹40,000
Simple Payback Period	1 months

Summary Table

Item	Amount
Current Sanctioned Demand	125 kVA
Actual Demand	88 kVA
Current Demand Charges	₹43,912
Rate per kVA	₹454 per kVA
Reduced Sanctioned Demand	80 kVA
New Demand Charges (for 80 kVA)	₹36,320
Monthly Cost Savings	₹454
Total Cost of Demand Controller	₹40,000
Simple Payback Period	1 mont

USE OF ELECTRICITY DURING PEAK HOUR AND OFF-PEAK HOUR

The applicable electricity tariff is not also based on timing of the day but it may not be applicable in case of domestic LT/ HT type connection. This will also helpful in maintaining the demand graph. It is recommended to avoid use of electrical gadget for cleaning, watering etc. during the peak hours. This type of work should be operational during the off peak hour.

1.7 POWER FACTOR

Parameter	Before APFC Panel	After APFC Panel
Power Factor	0.96	0.99
Sanctioned kVA	125	125
Maximum Demand (kW)	88	88
Reactive Power (kVAR)	88.9	17.625
Energy Charges (for estimation)	1,33,566.72	

Time 1 month (720 hours)

Rate Rs. 8.96 per kVAR-hour

Reactive Energy Charges Estimate	Rs. 56244.30
Estimated Cost Savings	- Rs. 8344.92

1.8 DISTRIBUTION NETWORK

There is a main electrical panel installed near the DG Set. All the distribution cables are going from the main panel to all the buildings, submersible pump, street light etc. Sub panels are installed in the buildings. There is a taping on each floor from the raising mains.

During the study, it was observed that the conductor size is good according to ampere load. No any conductor was found over heated or its insulation burnt. Adequate size of conductor is going to feed the utility area. So, distribution losses are within the limit.

1.9 D G SETS

There is a DG set available in the college of capacity 82 kVA for in house generation of electricity. As the power supply is very good in the area so the running hour of DG set is very less.

It is advisable to put an energy meter on each DG set then it would be easy to conduct the efficiency of DG set. This way, the operator could also note down the unit generation and oil consumed. The operator may record the operating parameters of the sets in the following manner in future.

The mechanical details like temperature, lube oil etc. should be in addition

data, the management may calculate the offices generated by the DG set in an hour and total diesel consumption. The offices generated per litre of diesel consumed can hence be calculated on an hourly basis. Thereafter, the monthly figures can be calculated in the similar fashion.

It may be noted that the efficiency of the DG set depends largely on the operating load factor.

The maximum efficiency of the DG set is available at about 80-85% load factor.

SECTION 2 Lights, Air-condition & Solar PV

2.1 LIGHTING

The total lighting (luminary) load of the college is about 8 kW which includes Fluorescent tubes 36w/ 40w, LED lights 12w/ 36w etc. LED lights is good from energy efficiency point of view.

LED tube lights are also available in the market, which is also good from energy efficiency point of view. Whenever 36/40w tube gets fuse (not in warranty period) then it could be replaced by 18w/ 9w LED tube. There are 20 nos of street lights which are working on solar power with battery. These lights are switched ON in the night with the help of timer.

During study, tube lights were ON in the class room and it was observed that lux level was good (240 – 320) in the class room near to window. But Lux level was down (120 – 200) near the entrance door and its wall side. It is advisable to increase some tube lights in the class room for better lux value.

2.2 Air Conditioning Load

In the Unit/ college, there are package unit of 6 x 10TR, 4 x 8.5 TR, 8 nos of cassette unit (5 x 2TR, 3 x 3TR) and 15 nos of 2 TR split units Air-conditioners to maintain comfort temperature in the Auditorium/ office etc. Package units are installed mainly for the Auditorium.

Due to the study being done in winters, the Energy efficiency assessment could not be done for the ACs. However, it was observed that some split ACs fitted in the office carries 5 star, which is good from energy efficiency point of view. It is recommended that whenever new split/ window ACs are being installed, it should be 5 star rated. Filters of package units were also checked during study which was found very clean.

Energy Consumption in star rated split office is given above for information.

S.No.	Type of Ac	Rated TR	Star	KW
1	Split	1.5	*	1.91 - 2.1
2	Split	1.5	**	1.75 - 1.9
3	Split	1.5	***	1.65 - 1.74
4	Split	1.5	****	1.55 - 1.64
5	Split	1.5	*****	1.45 - 1.54

Star rated window ACs are also available in the market. It also consumes similar power as there in split office. Proper cleaning of ACs are very important for its output performance. At least, once in two months cleaning of ACs filter is recommended during the season.

2.3 SOLAR POWER GENERATION

There is a Solar Photovoltaic (SPV) unit for Power Generation with capacity 67 kW. The SPV is connected with the LT supply with some relay/sensor which keeps senses of electrical supply. When there is electrical supply, the SPV will generate electricity. As the electrical supply goes off, the SPV will not generate any electricity. SPV will also not generate electricity when there is electrical supply of DG set.

The best use of SPV is to put all lighting, exhaust fan load, fan load etc. on it. Some intelligent relay/ sensor need to install for better management. The energy meter should also be calibrated by third party once in a year or two years. This way, the SPV will continue supply even there is utility supply available or not and it will also help in saving a substantial amount in the electricity bill. It was also observed that electrical data like daily/ weekly/ monthly units generated by SPV are not recorded in the register or in soft copy.

The SPV system should be installed along with Net metering system. For this, there is a proper format in the concerned MSEDCL, MAHARASHTRA office to install Net metering. Benefits of net metering is given below:

Advantage of Net Metering

1. Financial benefit for the system owner

Since the system owner is charged for the net energy consumed from the utility grid, the owner gets financial benefits. Eg. If energy generation < energy consumed: owner pays just for the net amount. If energy generation > energy consumed: the owner gets credit for excess generation.

2. Avoid the use of batteries

In a grid connected solar pv system, any excess energy generated can be fed back to local utility grid and can be taken back at later stage when required. Thus, there is no need to store the surplus energy in batteries for later use, thus, avoiding the heavy costs of batteries. Also, since batteries are eliminated, the maintenance costs of the system also reduce to a great extent. Batteries may be required only when there are frequent power fluctuations/outages.

3. Produce more today, use that tomorrow

If there is a surplus of power generation than the consumption, the surplus can be fed into grid system and if consumption increases, it can be taken from the grid.

General Energy Conservation Tips

Electricity

- Schedule your operations to maintain a high load factor
- Minimize maximum demand by tripping loads through a demand controller
- Use standby electric generation equipment for on-peak high load periods.
- Correct power factor to at least 0.99 under rated load conditions.
- Set transformer taps to optimum settings.
- Shut off unnecessary computers, printers, and copiers at night.

Motors

- Properly size to the load for optimum efficiency.
- (High efficiency motors offer of 4 - 5% higher efficiency than standard motors)
- Check alignment.
- Provide proper ventilation
- (For every 10°C increase in motor operating temperature over recommended peak, the motor life is estimated to be halved)□Check for under-voltage and over-voltage conditions.
- Balance the three-phase power supply.
- (An Imbalanced voltage can reduce 3 - 5% in motor input power)
- Demand efficiency restoration after motor rewinding.

Fans

- Use smooth, well-rounded air inlet cones for fan air intakes.
- Avoid poor flow distribution at the fan inlet.
- Minimize fan inlet and outlet obstructions.
- Clean screens, filters, and fan blades regularly.
- Use aerofoil-shaped fan blades.
- Minimize fan speed.
- Use low-slip or flat belts.
- Check belt tension regularly.
- Eliminate variable pitch pulleys.
- Use variable speed drives for large variable fan loads.
- Use energy-efficient motors for continuous or near-continuous operation
- Eliminate leaks in ductwork.

- Minimize bends in ductwork
- Turn fans off when not needed.

Blowers

- Use smooth, well-rounded air inlet ducts or cones for air intakes.
- Minimize blower inlet and outlet obstructions.
- Clean screens and filters regularly.
- Minimize blower speed.
- Use low-slip or no-slip belts.
- Check belt tension regularly.
- Eliminate variable pitch pulleys.
- Use variable speed drives for large variable blower loads.
- Use energy-efficient motors for continuous or near-continuous operation.
- Eliminate ductwork leaks.
- Turn blowers off when they are not needed.

Pumps

- Operate pumping near best efficiency point.
- Modify pumping to minimize throttling.
- Adapt to wide load variation with variable speed drives or sequenced control of smaller offices.
- Stop running both pumps -- add an auto-start for an on-line spare or add a booster pump in the problem area.
- Use booster pumps for small loads requiring higher pressures.
- Increase fluid temperature differentials to reduce pumping rates.
- Repair seals and packing to minimize water waste.

Balance the system to minimize flows and reduce pump power requirements.

- Use siphon effect to advantage: don't waste pumping head with a free-fall (gravity) return.

Chillers

- Increase the chilled water temperature set point if possible.
- Use the lowest temperature condenser water available that the chiller can handle.
- (Reducing condensing temperature by 5.5°C, results in a 20 - 25% decrease in compressor power consumption)
- Increase the evaporator temperature
- (5.5°C increase in evaporator temperature reduces compressor power consumption by 20 - 25%)
- Clean heat exchangers when fouled.
- (1 mm scale build-up on condenser tubes can increase energy consumption by 40%)
- Optimize condenser water flow rate and refrigerated water flow rate.
- Use water-cooled rather than air-cooled chiller condensers.
- Use energy-efficient motors for continuous or near-continuous operation.
- Specify appropriate fouling factors for condensers.
- Do not overcharge oil.
- Install a control system to coordinate multiple chillers.
- Study part-load characteristics and cycling costs to determine the most-efficient mode for operating multiple chillers.
- Run the chillers with the lowest operating costs to serve base load.
- Avoid over sizing - match the connected load.
- Isolate off-line chillers and cooling towers.
- Establish a chillers efficiency-maintenance program. Start with an energy audit and follow-up, then make a chillers efficiency-maintenance program a part of your continuous energy management program.

HVAC (Heating / Ventilation / Air Conditioning) □

Tune up the HVAC control system.

- Consider installing a building automation system (BAS) or energy management system (EMS) or restoring an out-of-service one.
- Balance the system to minimize flows and reduce blower/fan/pump power requirements.
- Eliminate or reduce reheat whenever possible.

- Use appropriate HVAC thermostat setback.
- Use building thermal lag to minimize HVAC equipment operating time.
- In winter during unoccupied periods, allow temperatures to fall as low as possible without freezing water lines or damaging stored materials.
- In summer during unoccupied periods, allow temperatures to rise as high as possible without damaging stored materials.
- Improve control and utilization of outside air.
- Use air-to-air heat exchangers to reduce energy requirements for heating and cooling of outside air.
- Reduce HVAC system operating hours (e.g. -- night, weekend).
- Optimize ventilation.
- Ventilate only when necessary. To allow some areas to be shut down when unoccupied, install dedicated HVAC systems on continuous loads (e.g. -- computer rooms).
- Provide dedicated outside air supply to kitchens, cleaning rooms, combustion equipment, etc. to avoid excessive exhausting of conditioned air.
- Use evaporative cooling in dry climates.
- Clean HVAC office coils periodically and comb mashed fins.
- Upgrade filter banks to reduce pressure drop and thus lower fan power requirements.
- Check HVAC filters on a schedule (at least monthly) and clean/change if appropriate.

  Check pneumatic controls air compressors for proper operation, cycling, and maintenance.
- Isolate air-conditioned loading dock areas and cool storage areas using highspeed doors or clear PVC strip curtains.
- Install ceiling fans to minimize thermal stratification in high-bay areas.
- Relocate air diffusers to optimum heights in areas with high ceilings.
- Consider reducing ceiling heights.
- Eliminate obstructions in front of radiators, baseboard heaters, etc.
- Check reflectors on infrared heaters for cleanliness and proper beam direction.
- Use professionally-designed industrial ventilation hoods for dust and vapor control.
- Use local infrared heat for personnel rather than heating the entire area.
- Use spot cooling and heating (e.g. -- use ceiling fans for personnel rather than cooling the entire area).
- Purchase only high-efficiency models for HVAC offices.
- Put HVAC window offices on timer control.

- Don't oversize cooling offices. (Oversized offices will "short cycle" which results in poor humidity control.)
- Install multi-fueling capability and run with the cheapest fuel available at the time.
- Consider dedicated make-up air for exhaust hoods. (Why exhaust the air conditioning or heat if you don't need to?) Minimize HVAC fan speeds.
- Consider desiccant drying of outside air to reduce cooling requirements in humid climates.
- Seal leaky HVAC ductwork.
- Seal all leaks around coils.
- Repair loose or damaged flexible connections (including those under air handling offices).
- Eliminate simultaneous heating and cooling during seasonal transition periods.
- Zone HVAC air and water systems to minimize energy use.
- Inspect, clean, lubricate, and adjust damper blades and linkages.
- Establish an HVAC efficiency-maintenance program. Start with an energy audit and follow-up, then make an HVAC efficiency-maintenance program a part of your continuous energy management program.

Lighting

- Reduce excessive illumination levels to standard levels using switching; delamping, etc. (Know the electrical effects before doing de-lamping.)
- Aggressively control lighting with clock timers, delay timers, photocells, and/or occupancy sensors.
- Install efficient alternatives to incandescent lighting, mercury vapour lighting, etc. Efficiency (lumens/watt) of various technologies range from best to worst approximately as follows: low pressure sodium, high-pressure sodium, metal halide, fluorescent, mercury vapour, incandescent.
- Select ballasts and lamps carefully with high power factor and long-term efficiency in mind.
- Upgrade obsolete fluorescent systems to Compact fluorescents and electronic ballasts
- Consider lowering the fixtures to enable using less of them.
- Consider day lighting, sky lights, etc.
- Consider painting the walls a lighter colour and using less lighting fixtures or lower wattages.
- Use task lighting and reduce background illumination.
- Re-evaluate exterior lighting strategy, type, and control. Control it aggressively.
- Change exit signs from incandescent to LED.

DG sets

- Optimize loading
- Use waste heat to generate steam/hot water /power an absorption chiller or preheat process or utility feeds.
- Use jacket and head cooling water for process needs

  Clean air filters regularly

  Insulate exhaust pipes to reduce DG set room temperatures Use cheaper heavy fuel oil for capacities more than 1MW

Buildings

- Seal exterior cracks / openings / gaps with caulk, gasketing, weather stripping, etc.
- Consider new thermal doors, thermal windows, roofing insulation, etc.
- Install windbreaks near exterior doors.
- Replace single-pane glass with insulating glass.
- Consider covering some window and skylight areas with insulated wall panels inside the building.
- If visibility is not required but light is required, consider replacing exterior windows with insulated glass block.
- Consider tinted glass, reflective glass, coatings, awnings, overhangs, draperies, blinds, and shades for sunlit exterior windows.
- Use landscaping to advantage.
- Add vestibules or revolving doors to primary exterior personnel doors.
- Consider automatic doors, air curtains, strip doors, etc. at high-traffic passages between conditioned and non-conditioned spaces. Use self-closing doors if possible.
- Use intermediate doors in stairways and vertical passages to minimize building stack effect.
- Use dock seals at shipping and receiving doors.
- Bring cleaning personnel in during the working day or as soon after as possible to minimize lighting and HVAC costs.

Water & Wastewater

- Recycle water, particularly for uses with less-critical quality requirements.
- Recycle water, especially if sewer costs are based on water consumption.
- Balance closed systems to minimize flows and reduce pump power requirements.

  Eliminate once-through cooling with water.

Use the least expensive type of water that will satisfy the requirement.

Fix water leaks.

- Test for underground water leaks. (It's easy to do over a holiday shutdown.) Check water overflow pipes for proper operating level.
- Automate blow down to minimize it.
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Given Data from Energy Bill

Item	Value
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Actual Demand	75 kVA
Current Demand Charges	₹ 32,400.00

Calculation Details

Calculation Step	Value
Rate per kVA	₹432 per kVA
Reduced Sanctioned Demand (Example)	70 kVA
New Demand Charges for 80 kVA	₹30240
Monthly Cost Savings	₹2160
Total Cost of Demand Controller	₹40,000
Simple Payback Period	20 months

Summary Table

Item	Amount
Current Sanctioned Demand	125 kVA
Actual Demand	75 kVA
Current Demand Charges	₹32,400.00
Rate per kVA	₹432 per kVA
Reduced Sanctioned Demand	70 kVA
New Demand Charges (for 80 kVA)	₹3024(

YASHODA TECHNICAL CAMPUS 6757 SATARA

DIRECTOR
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Monthly Cost Savings	₹2160

Total Cost of Demand Controller	₹40,000
Simple Payback Period	20 months

USE OF ELECTRICITY DURING PEAK HOUR AND OFF-PEAK HOUR

The applicable electricity tariff is not also based on timing of the day but it may not be applicable in case of domestic LT/ HT type connection. This will also helpful in maintaining the demand graph. It is recommended to avoid use of electrical gadget for cleaning, watering etc. during the peak hours. This type of work should be operational during the off peak hour.

1.7 POWER FACTOR

Parameter	Before APFC Panel	After APFC Panel
Power Factor	0.97	
Sanctioned kVA	125	125
Maximum Demand (kW)	75	
Reactive Power (kVAR)	88.9	17.625
Energy Charges (for estimation)	77,354.79	
Time	1 month (720 hours)	
Rate	Rs. 9.21per kVAR-hour	
Reactive Energy Charges Estimate	Rs. 52644.30	
Estimated Cost Savings	- Rs. 9322.30	

1.8 DISTRIBUTION NETWORK

There is a main electrical panel installed near the DG Set. All the distribution cables are going from the main panel to all the buildings, submersible pump, street light etc. Sub panels are installed in the buildings. There is a taping on each floor from the raising mains.

During the study, it was observed that the conductor size is good according to ampere load. No any conductor was found over heated or its insulation burnt. Adequate size of conductor is going to feed the utility area. So, distribution losses are within the limit.

1.9 D G SETS

There is a DG set available in the college of capacity 82 kVA for in house generation of electricity. As the power supply is very good in the area so the running hour of DG set is

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It is advisable to put an energy meter on each DG set then it would be easy to conduct the efficiency of DG set. This way, the operator could also note down the unit generation and oil consumed. The operator may record the operating parameters of the sets in the following manner in future.

The mechanical details like temperature, lube oil etc. should be in addition to the above. From the above data, the management may calculate the offices generated by the DG set in an hour and total diesel consumption. The offices generated per litre of diesel consumed can hence be calculated on an hourly basis. Thereafter, the monthly figures can be calculated in the similar fashion.

It may be noted that the efficiency of the DG set depends largely on the operating load factor.

The maximum efficiency of the DG set is available at about 80-85% load factor.

SECTION 2 Lights, Air-condition & Solar PV

2.1 LIGHTING

The total lighting (luminary) load of the college is about 8 kW which includes Fluorescent tubes 36w/ 40w, LED lights 12w/ 36w etc. LED lights is good from energy efficiency point of view.

LED tube lights are also available in the market, which is also good from energy efficiency point of view. Whenever 36/40w tube gets fuse (not in warranty period) then it could be replaced by 18w/ 9w LED tube. There are 20 nos of street lights which are working on solar power with battery. These lights are switched ON in the night with the help of timer.

During study, tube lights were ON in the class room and it was observed that lux level was good (240 – 320) in the class room near to window. But Lux level was down (120 – 200) near the entrance door and its wall side. It is advisable to increase some tube lights in the class room for better lux value.

2.2 Air Conditioning Load

In the Unit/ college, there are package unit of 6 x 10TR, 4 x 8.5 TR, 8 nos of cassette unit (5 x 2TR, 3 x 3TR) and 15 nos of 2 TR split units Air-conditioners to maintain comfort temperature in the Auditorium/ office etc. Package units are installed mainly for the Auditorium.

Due to the study being done in winters, the Energy efficiency assessment could not be done for the ACs. However, it was observed that some split ACs fitted in the office carries 5 star, which is good from energy efficiency point of view. It is recommended that whenever new split/ window ACs are being installed, it should be 5 star rated. Filters of package units were also checked during study which was found very clean.

Energy Consumption in star rated split office is given above for information.

S.No.	Type of Ac	Rated TR	Star	KW

YASHODA TECHNICAL CAMPUS 6757 SATARA

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1	Split	1.5	*	1.91 - 2.1
2	Split	1.5	**	1.75 - 1.9
3	Split	1.5	***	1.65 - 1.74
4	Split	1.5	****	1.55 - 1.64
5	Split	1.5	*****	1.45 - 1.54

Star rated window ACs are also available in the market. It also consumes similar power as there in split office. Proper cleaning of ACs are very important for its output performance. At least, once in two months cleaning of ACs filter is recommended during the season.

2.3 SOLAR POWER GENERATION

There is a Solar Photovoltaic (SPV) unit for Power Generation with capacity 67 kW. The SPV is connected with the LT supply with some relay/sensor which keeps senses of electrical supply. When there is electrical supply, the SPV will generate electricity. As the electrical supply goes off, the SPV will not generate any electricity. SPV will also not generate electricity when there is electrical supply of DG set.

The best use of SPV is to put all lighting, exhaust fan load, fan load etc. on it. Some intelligent relay/ sensor need to install for better management. The energy meter should also be calibrated by third party once in a year or two years. This way, the SPV will continue supply even there is utility supply available or not and it will also help in saving a substantial amount in the electricity bill. It was also observed that electrical data like daily/ weekly/ monthly units generated by SPV are not recorded in the register or in soft copy.

The SPV system should be installed along with Net metering system. For this, there is a proper format in the concerned MSEDCL, MAHARASHTRA office to install Net metering. Benefits of net metering is given below:

Advantage of Net Metering

1. Financial benefit for the system owner

Since the system owner is charged for the net energy consumed from the utility grid, the owner gets financial benefits. Eg. If energy generation < energy consumed: owner pays just for the net amount. If energy generation > energy consumed: the owner gets credit for excess generation.

2. Avoid the use of batteries

In a grid connected solar pv system, any excess energy generated can be fed back to local utility grid and can be taken back at later stage when required. Thus, there is no need to store the surplus energy in batteries for later use, thus, avoiding the heavy costs of batteries. Also, since batteries are eliminated, the maintenance costs of the system also reduce to a great extent. Batteries may be required only when there are frequent power fluctuations/outages.

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Yashoda Technical Campus
Satara

3. Produce more today, use that tomorrow

If there is a surplus of power generation than the consumption, the surplus can be fed into grid system and if consumption increases, it can be taken from the grid.

General Energy Conservation Tips

Electricity

- Schedule your operations to maintain a high load factor
- Minimize maximum demand by tripping loads through a demand controller
- Use standby electric generation equipment for on-peak high load periods.
- Correct power factor to at least 0.99 under rated load conditions.
- Set transformer taps to optimum settings.
- Shut off unnecessary computers, printers, and copiers at night.

Motors

- Properly size to the load for optimum efficiency.
- (High efficiency motors offer of 4 - 5% higher efficiency than standard motors)
- Check alignment.
- Provide proper ventilation
- (For every 10°C increase in motor operating temperature over recommended peak, the motor life is estimated to be halved) Check for under-voltage and over-voltage conditions.
- Balance the three-phase power supply.
- (An Imbalanced voltage can reduce 3 - 5% in motor input power)
- Demand efficiency restoration after motor rewinding.

Fans

- Use smooth, well-rounded air inlet cones for fan air intakes.
- Avoid poor flow distribution at the fan inlet.
- Minimize fan inlet and outlet obstructions.
- Clean screens, filters, and fan blades regularly.
- Use aerofoil-shaped fan blades.
- Minimize fan speed.

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Satara

- Use low-slip or flat belts.
- Check belt tension regularly.
- Eliminate variable pitch pulleys.
- Use variable speed drives for large variable fan loads.
- Use energy-efficient motors for continuous or near-continuous operation
- Eliminate leaks in ductwork.
- Minimize bends in ductwork
- Turn fans off when not needed.

Blowers

- Use smooth, well-rounded air inlet ducts or cones for air intakes.
- Minimize blower inlet and outlet obstructions.
- Clean screens and filters regularly.
- Minimize blower speed.
- Use low-slip or no-slip belts.
- Check belt tension regularly.
- Eliminate variable pitch pulleys.
- Use variable speed drives for large variable blower loads.
- Use energy-efficient motors for continuous or near-continuous operation.
- Eliminate ductwork leaks.
- Turn blowers off when they are not needed.

Pumps

- Operate pumping near best efficiency point.
- Modify pumping to minimize throttling.
- Adapt to wide load variation with variable speed drives or sequenced control of smaller offices.
- Stop running both pumps -- add an auto-start for an on-line spare or add a booster pump in the problem area.
- Use booster pumps for small loads requiring higher pressures.
- Increase fluid temperature differentials to reduce pumping rates.
- Repair seals and packing to minimize water waste.

Balance the system to minimize flows and reduce pump power requirements.

- Use siphon effect to advantage: don't waste pumping head with a free-fall (gravity) return.

Chillers

- Increase the chilled water temperature set point if possible.
- Use the lowest temperature condenser water available that the chiller can handle.
- (Reducing condensing temperature by 5.5°C, results in a 20 - 25% decrease in compressor power consumption)
- Increase the evaporator temperature
- (5.5°C increase in evaporator temperature reduces compressor power consumption by 20 - 25%)
- Clean heat exchangers when fouled.
- (1 mm scale build-up on condenser tubes can increase energy consumption by 40%)
- Optimize condenser water flow rate and refrigerated water flow rate.
- Use water-cooled rather than air-cooled chiller condensers.
- Use energy-efficient motors for continuous or near-continuous operation.
- Specify appropriate fouling factors for condensers.
- Do not overcharge oil.
- Install a control system to coordinate multiple chillers.
- Study part-load characteristics and cycling costs to determine the most-efficient mode for operating multiple chillers.
- Run the chillers with the lowest operating costs to serve base load.
- Avoid over sizing - match the connected load.
- Isolate off-line chillers and cooling towers.
- Establish a chillers efficiency-maintenance program. Start with an energy audit and follow-up, then make a chillers efficiency-maintenance program a part of your continuous energy management program.

HVAC (Heating / Ventilation / Air Conditioning) □

Tune up the HVAC control system.

- Consider installing a building automation system (BAS) or energy management system (EMS) or restoring an out-of-service one.
- Balance the system to minimize flows and reduce blower/fan/pump power requirements.
- Eliminate or reduce reheat whenever possible.

- Use appropriate HVAC thermostat setback.
- Use building thermal lag to minimize HVAC equipment operating time.
- In winter during unoccupied periods, allow temperatures to fall as low as possible without freezing water lines or damaging stored materials.
- In summer during unoccupied periods, allow temperatures to rise as high as possible without damaging stored materials.
- Improve control and utilization of outside air.
- Use air-to-air heat exchangers to reduce energy requirements for heating and cooling of outside air.
- Reduce HVAC system operating hours (e.g. -- night, weekend).
- Optimize ventilation.
- Ventilate only when necessary. To allow some areas to be shut down when unoccupied, install dedicated HVAC systems on continuous loads (e.g. -- computer rooms).
- Provide dedicated outside air supply to kitchens, cleaning rooms, combustion equipment, etc. to avoid excessive exhausting of conditioned air.
- Use evaporative cooling in dry climates.
- Clean HVAC office coils periodically and comb mashed fins.
- Upgrade filter banks to reduce pressure drop and thus lower fan power requirements.
- Check HVAC filters on a schedule (at least monthly) and clean/change if appropriate.

  Check pneumatic controls air compressors for proper operation, cycling, and maintenance.
- Isolate air-conditioned loading dock areas and cool storage areas using highspeed doors or clear PVC strip curtains.
- Install ceiling fans to minimize thermal stratification in high-bay areas.
- Relocate air diffusers to optimum heights in areas with high ceilings.
- Consider reducing ceiling heights.
- Eliminate obstructions in front of radiators, baseboard heaters, etc.
- Check reflectors on infrared heaters for cleanliness and proper beam direction.
- Use professionally-designed industrial ventilation hoods for dust and vapor control.
- Use local infrared heat for personnel rather than heating the entire area.
- Use spot cooling and heating (e.g. -- use ceiling fans for personnel rather than cooling the entire area).
- Purchase only high-efficiency models for HVAC offices.
- Put HVAC window offices on timer control.

- Don't oversize cooling offices. (Oversized offices will "short cycle" which results in poor humidity control.)
- Install multi-fueling capability and run with the cheapest fuel available at the time.
- Consider dedicated make-up air for exhaust hoods. (Why exhaust the air conditioning or heat if you don't need to?) Minimize HVAC fan speeds.
- Consider desiccant drying of outside air to reduce cooling requirements in humid climates.
- Seal leaky HVAC ductwork.
- Seal all leaks around coils.
- Repair loose or damaged flexible connections (including those under air handling offices).
- Eliminate simultaneous heating and cooling during seasonal transition periods.
- Zone HVAC air and water systems to minimize energy use.
- Inspect, clean, lubricate, and adjust damper blades and linkages.
- Establish an HVAC efficiency-maintenance program. Start with an energy audit and follow-up, then make an HVAC efficiency-maintenance program a part of your continuous energy management program.

Lighting

- Reduce excessive illumination levels to standard levels using switching; delamping, etc. (Know the electrical effects before doing de-lamping.)
- Aggressively control lighting with clock timers, delay timers, photocells, and/or occupancy sensors.
- Install efficient alternatives to incandescent lighting, mercury vapour lighting, etc. Efficiency (lumens/watt) of various technologies range from best to worst approximately as follows: low pressure sodium, high-pressure sodium, metal halide, fluorescent, mercury vapour, incandescent.
- Select ballasts and lamps carefully with high power factor and long-term efficiency in mind.
- Upgrade obsolete fluorescent systems to Compact fluorescents and electronic ballasts
- Consider lowering the fixtures to enable using less of them.
- Consider day lighting, sky lights, etc.
- Consider painting the walls a lighter colour and using less lighting fixtures or lower wattages.
- Use task lighting and reduce background illumination.
- Re-evaluate exterior lighting strategy, type, and control. Control it aggressively.
- Change exit signs from incandescent to LED.

DG sets

- Optimize loading
- Use waste heat to generate steam/hot water /power an absorption chiller or preheat process or utility feeds.
- Use jacket and head cooling water for process needs

  Clean air filters regularly

  Insulate exhaust pipes to reduce DG set room temperatures Use cheaper heavy fuel oil for capacities more than 1MW

Buildings

- Seal exterior cracks / openings / gaps with caulk, gasketing, weather stripping, etc.
- Consider new thermal doors, thermal windows, roofing insulation, etc.
- Install windbreaks near exterior doors.
- Replace single-pane glass with insulating glass.
- Consider covering some window and skylight areas with insulated wall panels inside the building.
- If visibility is not required but light is required, consider replacing exterior windows with insulated glass block.
- Consider tinted glass, reflective glass, coatings, awnings, overhangs, draperies, blinds, and shades for sunlit exterior windows.
- Use landscaping to advantage.
- Add vestibules or revolving doors to primary exterior personnel doors.
- Consider automatic doors, air curtains, strip doors, etc. at high-traffic passages between conditioned and non-conditioned spaces. Use self-closing doors if possible.
- Use intermediate doors in stairways and vertical passages to minimize building stack effect.
- Use dock seals at shipping and receiving doors.
- Bring cleaning personnel in during the working day or as soon after as possible to minimize lighting and HVAC costs.

Water & Wastewater

- Recycle water, particularly for uses with less-critical quality requirements.
- Recycle water, especially if sewer costs are based on water consumption.
- Balance closed systems to minimize flows and reduce pump power requirements.

  Eliminate once-through cooling with water.

Use the least expensive type of water that will satisfy the requirement.

Fix water leaks.

- Test for underground water leaks. (It's easy to do over a holiday shutdown.) Check water overflow pipes for proper operating level.
- Automate blow down to minimize it.
- Provide proper tools for wash down -- especially self-closing nozzles.
- Install efficient irrigation.
- Reduce flows at water sampling stations.
- Eliminate continuous overflow at water tanks.
- Promptly repair leaking toilets and faucets.
- Use water restrictors on faucets, showers, etc.
- Use self-closing type faucets in restrooms.
- Use the lowest possible hot water temperature.
- Do not use a heating system hot water boiler to provide service hot water during the cooling season -- install a smaller, more-efficient system for the cooling season service hot water.
- If water must be heated electrically, consider accumulation in a large insulated storage tank to minimize heating at on-peak electric rates.
- Use multiple, distributed, small water heaters to minimize thermal losses in large piping systems.
- Use freeze protection valves rather than manual bleeding of lines.
- Consider leased and mobile water treatment systems, especially for deionized water.
- Seal sumps to prevent seepage inward from necessitating extra sump pump operation.
- Install pre-treatment to reduce TOC and BOD surcharges.
- Verify the water meter readings. (You'd be amazed how long a meter reading can be estimated after the meter breaks or the meter pit fills with water!)
- Verify the sewer flows if the sewer bills are based on them

Miscellaneous

- Meter any unmetered utilities to know what normal efficient use is. Track down causes of deviations.
- Shut down spare, idling, or unneeded equipment.
- Make sure that all of the utilities to redundant areas are turned off -- including utilities like compressed air and cooling water.
- Install automatic control to efficiently coordinate multiple air compressors, chillers, cooling tower cells, boilers, etc.
- Renegotiate utilities contracts to reflect current loads and variations.
- Consider buying utilities from neighbours, particularly to handle peaks.
- Leased space often has low-bid inefficient equipment. Consider upgrades if your lease will continue for several more years.
- Adjust fluid temperatures within acceptable limits to minimize undesirable heat transfer in long pipelines.
- Minimize use of flow bypasses and minimize bypass flow rates.
- Provide restriction orifices in purges (nitrogen, steam, etc.).
- Eliminate unnecessary flow measurement orifices.
- Consider alternatives to high-pressure drops across valves.
- Turn off winter heat tracing that is on in summer.

ENERGY AUDIT REPORT

Faculty of Engineering Yashoda Technical Campus

Wadhe, Satara

2019-20

CONDUCTED BY:

Department of Electrical Engineering
Faculty of Engineering, YTC, Satara

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Table of Content

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YASHODA TECHNICAL CAMPUS 6757 SATARA

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Satara

EXECUTIVE SUMMARY

The assignment was conducted and the following areas have been covered in the study:

- Electricity Bill
- Distribution Network
- DG Sets
- Lights
- Air Conditioning Load
- Solar Power, etc.

The summary of the observations and recommendations from the energy management study of the college building is given below:

The Running Maximum Demand (kVA) of the college varies monthly. The power factor also varies, affecting the demand and billing. Details of Power Factor are provided in the report.

A STATUS OF THE COLLEGE BUILDING

A.1 General

Yashoda Technical Campus Faculty of Engineering is affiliated with Dr. Babasaheb Ambedkar Technological University Lonere, established in 2011. It offers higher education in Engineering and Technology and is located on the outskirts of Satara city.

A.2 Energy Sources

Electricity is the major energy source of the college, supplied by MSEDCL Maharashtra. Diesel fuel is used in the DG set for in-house electricity generation during power cuts. Solar power station of 67kW capacity is installed.

A.3 Energy Consumption

The applicable electrical tariff consists of a fixed cost (Demand Charges) and unit (kWh) rate. The average monthly unit consumption and electricity bill amount for the last 12 months are provided below:

BILLING HISTORY			
Bill Month	**Units**	**Bill Demand(KVA)**	**Bill Amount**
APR-20	12,092	69	1,80,361
MAR-20	15,052	74	2,37,795
FEB-20	18,136	79	2,85,542
JAN-20	17,356	81	2,73,601
DEC-19	17,455	65	2,64,327
NOV-19	17,805	65	2,68,949
OCT-19	18,658	67	2,66,774
SEP-19	17,844	65	2,50,077
AUG-19	17,252	65	2,36,140
JUL-19	17,471	65	2,46,799
JUN-19	12,969	65	1,95,885
MAY-19	21,504	72	3,11,883

A.4 DG Sets

There is one DG set of 82 kVA capacity installed in the college. Due to minimal power cuts, the running hours of the DG set are very limited.

A.5 Air Conditioning

The college has various air-conditioning units to maintain comfort temperature in the offices and classrooms.

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SECTION 1: Electrical Supply & Billings

1.1 ELECTRICAL SUPPLY

The college receives electrical supply from MSEDCL Maharashtra. One energy meter and a transformer of 11 kV/ 433 V, 990 kVA capacity are installed.

1.2 SANCTIONED DEMAND

The sanctioned demand for the college is 198.6 kW. The running maximum demand and fixed cost from the electricity bill are detailed below:

Bill Month	Sanctioned Demand (kVA)	Running Max. Demand (kVA)	Fixed Cost (Rs)
APR-20	125	69	1,80,361
MAR-20	125	74	2,37,795
FEB-20	125	79	2,85,542
JAN-20	125	81	2,73,601
DEC-19	125	65	2,64,327
NOV-19	125	65	2,68,949
OCT-19	125	67	2,66,774
SEP-19	125	65	2,50,077
AUG-19	125	65	2,36,140
JUL-19	125	65	2,46,799
JUN-19	125	65	1,95,885
MAY-20	125	69	1,71,680

1.3 POWER FACTOR

The power factor for the college varies monthly, impacting the billing and demand charges. Improvements in the power factor could result in significant cost savings.

1.4 DISTRIBUTION NETWORK

The main electrical panel and distribution cables are adequate, with no signs of overheating or insulation damage, ensuring minimal distribution losses.

1.5 DG SETS

An energy meter should be installed on the DG set to monitor its efficiency, unit generation, and diesel consumption.

1.6. SAVING IN COST CALCULATION.

Given Data from Energy Bill

Item	Value
Current Sanctioned Demand	125 kVA
Actual Demand	69 kVA
Current Demand Charges	₹ 28,359.

Calculation Details

Calculation Step	Value
Rate per kVA	₹411 per kVA
Reduced Sanctioned Demand (Example)	70 kVA
New Demand Charges for 80 kVA	Nil
Monthly Cost Savings	Nil
Total Cost of Demand Controller	Nil
Simple Payback Period	Nil

Summary Table

Item	Amount
Current Sanctioned Demand	125 kVA
Actual Demand	75 kVA
Current Demand Charges	₹28,359.00
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Reduced Sanctioned Demand	Nil
New Demand Charges (for 80 kVA)	Nil
Monthly Cost Savings	Nil
Total Cost of Demand Controller	Nil
Simple Payback Period	Nil

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1.7 POWER FACTOR

Parameter	Before APFC Panel	After APFC Panel
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During the study, it was observed that the conductor size is good according to ampere load. No any conductor was found over heated or its insulation burnt. Adequate size of conductor is going to feed the utility area. So, distribution losses are within the limit.

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The maximum efficiency of the DG set is available at about 80-85% load factor.

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LED tube lights are also available in the market, which is also good from energy efficiency point of view. Whenever 36/40w tube gets fuse (not in warranty period) then it could be replaced by 18w/ 9w LED tube. There are 20 nos of street lights which are working on solar power with battery. These lights are switched ON in the night with the help of timer.

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In the Unit/ college, there are package unit of 6 x 10TR, 4 x 8.5 TR, 8 nos of cassette unit (5 x 2TR, 3 x 3TR) and 15 nos of 2 TR split units Air-conditioners to maintain comfort temperature in the Auditorium/ office etc. Package units are installed mainly for the Auditorium.

Due to the study being done in winters, the Energy efficiency assessment could not be done for the ACs. However, it was observed that some split ACs fitted in the office carries 5 star, which is good from energy efficiency point of view. It is recommended that whenever new split/ window ACs are being installed, it should be 5 star rated. Filters of package units were also checked during study which was found very clean.

Energy Consumption in star rated split office is given above for information.

S.No.	Type of Ac	Rated TR	Star	KW
1	Split	1.5	*	1.91 - 2.1
2	Split	1.5	**	1.75 - 1.9
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4	Split	1.5	****	1.55 - 1.64
5	Split	1.5	*****	1.45 - 1.54

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Since the system owner is charged for the net energy consumed from the utility grid, the owner gets financial benefits. Eg. If energy generation < energy consumed: owner pays just for the net amount. If energy generation > energy consumed: the owner gets credit for excess generation.

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In a grid connected solar pv system, any excess energy generated can be fed back to local utility grid and can be taken back at later stage when required. Thus, there is no need to store the surplus energy in batteries for later use, thus, avoiding the heavy costs of batteries. Also, since batteries are eliminated, the maintenance costs of the system also reduce to a great extent. Batteries may be required only when there are frequent power fluctuations/outages.

3. Produce more today, use that tomorrow

If there is a surplus of power generation than the consumption, the surplus can be fed into grid system and if consumption increases, it can be taken from the grid.

General Energy Conservation Tips

Electricity

- Schedule your operations to maintain a high load factor
- Minimize maximum demand by tripping loads through a demand controller
- Use standby electric generation equipment for on-peak high load periods.
- Correct power factor to at least 0.99 under rated load conditions.
- Set transformer taps to optimum settings.
- Shut off unnecessary computers, printers, and copiers at night.

Motors

- Properly size to the load for optimum efficiency.
- (High efficiency motors offer of 4 - 5% higher efficiency than standard motors)
- Check alignment.
- Provide proper ventilation
- (For every 10°C increase in motor operating temperature over recommended peak, the motor life is estimated to be halved) Check for under-voltage and over-voltage conditions.
- Balance the three-phase power supply.
- (An Imbalanced voltage can reduce 3 - 5% in motor input power)
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- Use smooth, well-rounded air inlet cones for fan air intakes.
- Avoid poor flow distribution at the fan inlet.
- Minimize fan inlet and outlet obstructions.
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- Minimize fan speed.
- Use low-slip or flat belts.
- Check belt tension regularly.
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- Use variable speed drives for large variable fan loads.
- Use energy-efficient motors for continuous or near-continuous operation
- Eliminate leaks in ductwork.

- Minimize bends in ductwork
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Blowers

- Use smooth, well-rounded air inlet ducts or cones for air intakes.
- Minimize blower inlet and outlet obstructions.
- Clean screens and filters regularly.
- Minimize blower speed.
- Use low-slip or no-slip belts.
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- Eliminate variable pitch pulleys.
- Use variable speed drives for large variable blower loads.
- Use energy-efficient motors for continuous or near-continuous operation.
- Eliminate ductwork leaks.
- Turn blowers off when they are not needed.

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- Operate pumping near best efficiency point.
- Modify pumping to minimize throttling.
- Adapt to wide load variation with variable speed drives or sequenced control of smaller offices.
- Stop running both pumps -- add an auto-start for an on-line spare or add a booster pump in the problem area.
- Use booster pumps for small loads requiring higher pressures.
- Increase fluid temperature differentials to reduce pumping rates.
- Repair seals and packing to minimize water waste.

Balance the system to minimize flows and reduce pump power requirements.

- Use siphon effect to advantage: don't waste pumping head with a free-fall (gravity) return.

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- Increase the chilled water temperature set point if possible.
- Use the lowest temperature condenser water available that the chiller can handle.
- (Reducing condensing temperature by 5.5°C, results in a 20 - 25% decrease in compressor power consumption)
- Increase the evaporator temperature
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- Study part-load characteristics and cycling costs to determine the most-efficient mode for operating multiple chillers.
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- Avoid over sizing - match the connected load.
- Isolate off-line chillers and cooling towers.
- Establish a chillers efficiency-maintenance program. Start with an energy audit and follow-up, then make a chillers efficiency-maintenance program a part of your continuous energy management program.

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- Eliminate or reduce reheat whenever possible.

- Use appropriate HVAC thermostat setback.
- Use building thermal lag to minimize HVAC equipment operating time.
- In winter during unoccupied periods, allow temperatures to fall as low as possible without freezing water lines or damaging stored materials.
- In summer during unoccupied periods, allow temperatures to rise as high as possible without damaging stored materials.
- Improve control and utilization of outside air.
- Use air-to-air heat exchangers to reduce energy requirements for heating and cooling of outside air.
- Reduce HVAC system operating hours (e.g. -- night, weekend).
- Optimize ventilation.
- Ventilate only when necessary. To allow some areas to be shut down when unoccupied, install dedicated HVAC systems on continuous loads (e.g. -- computer rooms).
- Provide dedicated outside air supply to kitchens, cleaning rooms, combustion equipment, etc. to avoid excessive exhausting of conditioned air.
- Use evaporative cooling in dry climates.
- Clean HVAC office coils periodically and comb mashed fins.
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- Check reflectors on infrared heaters for cleanliness and proper beam direction.
- Use professionally-designed industrial ventilation hoods for dust and vapor control.
- Use local infrared heat for personnel rather than heating the entire area.
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- Purchase only high-efficiency models for HVAC offices.
- Put HVAC window offices on timer control.

- Don't oversize cooling offices. (Oversized offices will "short cycle" which results in poor humidity control.)
- Install multi-fueling capability and run with the cheapest fuel available at the time.
- Consider dedicated make-up air for exhaust hoods. (Why exhaust the air conditioning or heat if you don't need to?) Minimize HVAC fan speeds.
- Consider desiccant drying of outside air to reduce cooling requirements in humid climates.
- Seal leaky HVAC ductwork.
- Seal all leaks around coils.
- Repair loose or damaged flexible connections (including those under air handling offices).
- Eliminate simultaneous heating and cooling during seasonal transition periods.
- Zone HVAC air and water systems to minimize energy use.
- Inspect, clean, lubricate, and adjust damper blades and linkages.
- Establish an HVAC efficiency-maintenance program. Start with an energy audit and follow-up, then make an HVAC efficiency-maintenance program a part of your continuous energy management program.

Lighting

- Reduce excessive illumination levels to standard levels using switching; delamping, etc. (Know the electrical effects before doing de-lamping.)
- Aggressively control lighting with clock timers, delay timers, photocells, and/or occupancy sensors.
- Install efficient alternatives to incandescent lighting, mercury vapour lighting, etc. Efficiency (lumens/watt) of various technologies range from best to worst approximately as follows: low pressure sodium, high-pressure sodium, metal halide, fluorescent, mercury vapour, incandescent.
- Select ballasts and lamps carefully with high power factor and long-term efficiency in mind.
- Upgrade obsolete fluorescent systems to Compact fluorescents and electronic ballasts
- Consider lowering the fixtures to enable using less of them.
- Consider day lighting, sky lights, etc.
- Consider painting the walls a lighter colour and using less lighting fixtures or lower wattages.
- Use task lighting and reduce background illumination.
- Re-evaluate exterior lighting strategy, type, and control. Control it aggressively.
- Change exit signs from incandescent to LED.

DG sets

- Optimize loading
- Use waste heat to generate steam/hot water /power an absorption chiller or preheat process or utility feeds.
- Use jacket and head cooling water for process needs

  Clean air filters regularly

  Insulate exhaust pipes to reduce DG set room temperatures Use cheaper heavy fuel oil for capacities more than 1MW

Buildings

- Seal exterior cracks / openings / gaps with caulk, gasketing, weather stripping, etc.
- Consider new thermal doors, thermal windows, roofing insulation, etc.
- Install windbreaks near exterior doors.
- Replace single-pane glass with insulating glass.
- Consider covering some window and skylight areas with insulated wall panels inside the building.
- If visibility is not required but light is required, consider replacing exterior windows with insulated glass block.
- Consider tinted glass, reflective glass, coatings, awnings, overhangs, draperies, blinds, and shades for sunlit exterior windows.
- Use landscaping to advantage.
- Add vestibules or revolving doors to primary exterior personnel doors.
- Consider automatic doors, air curtains, strip doors, etc. at high-traffic passages between conditioned and non-conditioned spaces. Use self-closing doors if possible.
- Use intermediate doors in stairways and vertical passages to minimize building stack effect.
- Use dock seals at shipping and receiving doors.
- Bring cleaning personnel in during the working day or as soon after as possible to minimize lighting and HVAC costs.

Water & Wastewater

- Recycle water, particularly for uses with less-critical quality requirements.
- Recycle water, especially if sewer costs are based on water consumption.
- Balance closed systems to minimize flows and reduce pump power requirements.

  Eliminate once-through cooling with water.

Use the least expensive type of water that will satisfy the requirement.

Fix water leaks.

- Test for underground water leaks. (It's easy to do over a holiday shutdown.) Check water overflow pipes for proper operating level.
- Automate blow down to minimize it.
- Provide proper tools for wash down -- especially self-closing nozzles.
- Install efficient irrigation.
- Reduce flows at water sampling stations.
- Eliminate continuous overflow at water tanks.
- Promptly repair leaking toilets and faucets.
- Use water restrictors on faucets, showers, etc.
- Use self-closing type faucets in restrooms.
- Use the lowest possible hot water temperature.
- Do not use a heating system hot water boiler to provide service hot water during the cooling season -- install a smaller, more-efficient system for the cooling season service hot water.
- If water must be heated electrically, consider accumulation in a large insulated storage tank to minimize heating at on-peak electric rates.
- Use multiple, distributed, small water heaters to minimize thermal losses in large piping systems.
- Use freeze protection valves rather than manual bleeding of lines.
- Consider leased and mobile water treatment systems, especially for deionized water.
- Seal sumps to prevent seepage inward from necessitating extra sump pump operation.
- Install pre-treatment to reduce TOC and BOD surcharges.
- Verify the water meter readings. (You'd be amazed how long a meter reading can be estimated after the meter breaks or the meter pit fills with water!)
- Verify the sewer flows if the sewer bills are based on them

Miscellaneous

- Meter any unmetered utilities to know what normal efficient use is. Track down causes of deviations.
- Shut down spare, idling, or unneeded equipment.
- Make sure that all of the utilities to redundant areas are turned off -- including utilities like compressed air and cooling water.
- Install automatic control to efficiently coordinate multiple air compressors, chillers, cooling tower cells, boilers, etc.
- Renegotiate utilities contracts to reflect current loads and variations.
- Consider buying utilities from neighbours, particularly to handle peaks.
- Leased space often has low-bid inefficient equipment. Consider upgrades if your lease will continue for several more years.
- Adjust fluid temperatures within acceptable limits to minimize undesirable heat transfer in long pipelines.
- Minimize use of flow bypasses and minimize bypass flow rates.
- Provide restriction orifices in purges (nitrogen, steam, etc.).
- Eliminate unnecessary flow measurement orifices.
- Consider alternatives to high-pressure drops across valves.
- Turn off winter heat tracing that is on in summer.

ENERGY AUDIT REPORT

Faculty of Engineering Yashoda Technical Campus

Wadhe, Satara

2018-19

CONDUCTED BY:

Department of Electrical Engineering
Faculty of Engineering, YTC, Satara

DIRECTOR
Yashoda Technical Campus
Satara

Table of Content

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EXECUTIVE SUMMARY

The assignment was conducted and the following areas have been covered in the study:

- Electricity Bill
- Distribution Network
- DG Sets
- Lights
- Air Conditioning Load
- Solar Power, etc.

The summary of the observations and recommendations from the energy management study of the college building is given below:

The Running Maximum Demand (kVA) of the college varies monthly. The power factor also varies, affecting the demand and billing. Details of Power Factor are provided in the report.

A STATUS OF THE COLLEGE BUILDING

A.1 General

Yashoda Technical Campus Faculty of Engineering is affiliated with Dr. Babasaheb Ambedkar Technological University Lonere, established in 2011. It offers higher education in Engineering and Technology and is located on the outskirts of Satara city.

A.2 Energy Sources

Electricity is the major energy source of the college, supplied by MSEDCL Maharashtra. Diesel fuel is used in the DG set for in-house electricity generation during power cuts. Solar power station of 67kW capacity is installed.

A.3 Energy Consumption

The applicable electrical tariff consists of a fixed cost (Demand Charges) and unit (kWh) rate. The average monthly unit consumption and electricity bill amount for the last 12 months are provided below:

BILLING HISTORY			
Bill Month	**Units**	**Bill Demand(KVA)**	**Bill Amount**
APR-19	22,798	86	3,33,811
MAR-19	20,755	63	2,90,168
FEB-19	16,026	63	2,28,869
JAN-19	17,733	63	2,56,986
DEC-18	16,053	63	2,31,422
NOV-18	14,866	63	2,12,039
OCT-18	19,355	63	2,83,137
SEP-18	16,558	63	2,36,620
AUG-18	15,356	63	1,94,176
JUL-18	15,367	63	1,91,284
JUN-18	15,397	63	1,99,274
MAY-18	20,612	66	2,57,341

A.4 DG Sets

There is one DG set of 82 kVA capacity installed in the college. Due to minimal power cuts, the running hours of the DG set are very limited.

A.5 Air Conditioning

The college has various air-conditioning units to maintain comfort temperature in the offices and classrooms.

YASHODA TECHNICAL CAMPUS 6757 SATARA

DIRECTOR
Yashoda Technical Campus
Satara

SECTION 1: Electrical Supply & Billings

1.1 ELECTRICAL SUPPLY

The college receives electrical supply from MSEDCL Maharashtra. One energy meter and a transformer of 11 kV/ 433 V, 990 kVA capacity are installed.

1.2 SANCTIONED DEMAND

The sanctioned demand for the college is 198.6 kW. The running maximum demand and fixed cost from the electricity bill are detailed below:

Bill Month	Sanctioned Demand (kVA)	Running Max. Demand (kVA)	Fixed Cost (Rs)
APR-19	125	86	3,33,811
MAR-19	125	63	2,90,168
FEB-19	125	63	2,28,869
JAN-19	125	63	2,56,986
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1.3 POWER FACTOR

The power factor for the college varies monthly, impacting the billing and demand charges. Improvements in the power factor could result in significant cost savings.

1.4 DISTRIBUTION NETWORK

YASHODA TECHNICAL CAMPUS 6757 SATARA

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The main electrical panel and distribution cables are adequate, with no signs of overheating or insulation damage, ensuring minimal distribution losses.

1.5 DG SETS

An energy meter should be installed on the DG set to monitor its efficiency, unit generation, and diesel consumption.

1.6. SAVING IN COST CALCULATION. Given Data from

Energy Bill

Item	Value
Current Sanctioned Demand	125 kVA
Actual Demand	86 kVA
Current Demand Charges	₹ 28,152

Calculation Details

Calculation Step	Value
Rate per kVA	₹391 per kVA
Reduced Sanctioned Demand (Example)	90 kVA
New Demand Charges for 80 kVA	Nil
Monthly Cost Savings	Nil
Total Cost of Demand Controller	Nil
Simple Payback Period	Nil

Summary Table

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Current Sanctioned Demand	125 kVA
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Monthly Cost Savings	Nil
Total Cost of Demand Controller	Nil
Simple Payback Period	Nil

USE OF ELECTRICITY DURING PEAK HOUR AND OFF-PEAK HOUR

The applicable electricity tariff is not also based on timing of the day but it may not be applicable in case of domestic LT/ HT type connection. This will also helpful in maintaining the demand graph. It is recommended to avoid use of electrical gadget for cleaning, watering etc. during the peak hours. This type of work should be operational during the off peak hour.

1.7 POWER FACTOR

Parameter	Before APFC Panel	After APFC Panel
Power Factor	0.94	
Sanctioned kVA	125	125
Maximum Demand (kW)	75	
Reactive Power (kVAR)	88.9	17.625
Energy Charges (for estimation)	77,354.79	
Time 1 month (720 hours)		
Rate Rs. 971per kVAR-hour		
Reactive Energy Charges Estimate	Rs. 66644.30	
Estimated Cost Savings	- Rs. 11325.45	

1.8 DISTRIBUTION NETWORK

There is a main electrical panel installed near the DG Set. All the distribution cables are going from the main panel to all the buildings, submersible pump, street light etc. Sub panels are installed in the buildings. There is a taping on each floor from the raising mains.

During the study, it was observed that the conductor size is good according to ampere load. No any conductor was found over heated or its insulation burnt. Adequate size of conductor is going to feed the utility area. So, distribution losses are within the limit.

1.9 D G SETS

There is a DG set available in the college of capacity 82 kVA for in house generation of electricity. As the power supply is very good in the area so the running hour of DG set is very less.

It is advisable to put an energy meter on each DG set then it would be easy to conduct the efficiency of DG set. This way, the operator could also note down the unit generation and oil consumed. The operator may record the operating parameters of the sets in the following manner in future.

The mechanical details like temperature, lube oil etc. should be in addition
data, the management may calculate the offices generated by the DG se

consumption. The offices generated per litre of diesel consumed can hence be calculated on an hourly basis. Thereafter, the monthly figures can be calculated in the similar fashion.

It may be noted that the efficiency of the DG set depends largely on the operating load factor.

The maximum efficiency of the DG set is available at about 80-85% load factor.

SECTION 2 Lights, Air-condition & Solar PV

2.1 LIGHTING

The total lighting (luminary) load of the college is about 8 kW which includes Fluorescent tubes 36w/ 40w, LED lights 12w/ 36w etc. LED lights is good from energy efficiency point of view.

LED tube lights are also available in the market, which is also good from energy efficiency point of view. Whenever 36/40w tube gets fuse (not in warranty period) then it could be replaced by 18w/ 9w LED tube. There are 20 nos of street lights which are working on solar power with battery. These lights are switched ON in the night with the help of timer.

During study, tube lights were ON in the class room and it was observed that lux level was good (240 – 320) in the class room near to window. But Lux level was down (120 – 200) near the entrance door and its wall side. It is advisable to increase some tube lights in the class room for better lux value.

2.2 Air Conditioning Load

In the Unit/ college, there are package unit of 6 x 10TR, 4 x 8.5 TR, 8 nos of cassette unit (5 x 2TR, 3 x 3TR) and 15 nos of 2 TR split units Air-conditioners to maintain comfort temperature in the Auditorium/ office etc. Package units are installed mainly for the Auditorium.

Due to the study being done in winters, the Energy efficiency assessment could not be done for the ACs. However, it was observed that some split ACs fitted in the office carries 5 star, which is good from energy efficiency point of view. It is recommended that whenever new split/ window ACs are being installed, it should be 5 star rated. Filters of package units were also checked during study which was found very clean.

Energy Consumption in star rated split office is given above for information.

S.No.	Type of Ac	Rated TR	Star	KW
1	Split	1.5	*	1.91 - 2.1
2	Split	1.5	**	1.75 - 1.9
3	Split	1.5	***	1.65 - 1.74
4	Split	1.5	****	1.55 - 1.64
5	Split	1.5	*****	1.45 - 1.54

Star rated window ACs are also available in the market. It also consumes similar power as there in split office. Proper cleaning of ACs are very important for its output performance. At least, once in two months cleaning of ACs filter is recommended during the season.

2.3 SOLAR POWER GENERATION

There is a Solar Photovoltaic (SPV) unit for Power Generation with capacity 67 kW. The SPV is connected with the LT supply with some relay/sensor which keeps senses of electrical supply. When there is electrical supply, the SPV will generate electricity. As the electrical supply goes off, the SPV will not generate any electricity. SPV will also not generate electricity when there is electrical supply of DG set.

The best use of SPV is to put all lighting, exhaust fan load, fan load etc. on it. Some intelligent relay/ sensor need to install for better management. The energy meter should also be calibrated by third party once in a year or two years. This way, the SPV will continue supply even there is utility supply available or not and it will also help in saving a substantial amount in the electricity bill. It was also observed that electrical data like daily/ weekly/ monthly units generated by SPV are not recorded in the register or in soft copy.

The SPV system should be installed along with Net metering system. For this, there is a proper format in the concerned MSEDCL, MAHARASHTRA office to install Net metering. Benefits of net metering is given below:

Advantage of Net Metering

1. Financial benefit for the system owner

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- Consider dedicated make-up air for exhaust hoods. (Why exhaust the air conditioning or heat if you don't need to?) Minimize HVAC fan speeds.
- Consider desiccant drying of outside air to reduce cooling requirements in humid climates.
- Seal leaky HVAC ductwork.
- Seal all leaks around coils.
- Repair loose or damaged flexible connections (including those under air handling offices).
- Eliminate simultaneous heating and cooling during seasonal transition periods.
- Zone HVAC air and water systems to minimize energy use.
- Inspect, clean, lubricate, and adjust damper blades and linkages.
- Establish an HVAC efficiency-maintenance program. Start with an energy audit and follow-up, then make an HVAC efficiency-maintenance program a part of your continuous energy management program.

Lighting

- Reduce excessive illumination levels to standard levels using switching; delamping, etc. (Know the electrical effects before doing de-lamping.)
- Aggressively control lighting with clock timers, delay timers, photocells, and/or occupancy sensors.
- Install efficient alternatives to incandescent lighting, mercury vapour lighting, etc. Efficiency (lumens/watt) of various technologies range from best to worst approximately as follows: low pressure sodium, high-pressure sodium, metal halide, fluorescent, mercury vapour, incandescent.
- Select ballasts and lamps carefully with high power factor and long-term efficiency in mind.
- Upgrade obsolete fluorescent systems to Compact fluorescents and electronic ballasts
- Consider lowering the fixtures to enable using less of them.
- Consider day lighting, sky lights, etc.
- Consider painting the walls a lighter colour and using less lighting fixtures or lower wattages.
- Use task lighting and reduce background illumination.
- Re-evaluate exterior lighting strategy, type, and control. Control it aggressively.
- Change exit signs from incandescent to LED.

DG sets

- Optimize loading
- Use waste heat to generate steam/hot water /power an absorption chiller or preheat process or utility feeds.
- Use jacket and head cooling water for process needs

  Clean air filters regularly

  Insulate exhaust pipes to reduce DG set room temperatures Use cheaper heavy fuel oil for capacities more than 1MW

Buildings

- Seal exterior cracks / openings / gaps with caulk, gasketing, weather stripping, etc.
- Consider new thermal doors, thermal windows, roofing insulation, etc.
- Install windbreaks near exterior doors.
- Replace single-pane glass with insulating glass.
- Consider covering some window and skylight areas with insulated wall panels inside the building.
- If visibility is not required but light is required, consider replacing exterior windows with insulated glass block.
- Consider tinted glass, reflective glass, coatings, awnings, overhangs, draperies, blinds, and shades for sunlit exterior windows.
- Use landscaping to advantage.
- Add vestibules or revolving doors to primary exterior personnel doors.
- Consider automatic doors, air curtains, strip doors, etc. at high-traffic passages between conditioned and non-conditioned spaces. Use self-closing doors if possible.
- Use intermediate doors in stairways and vertical passages to minimize building stack effect.
- Use dock seals at shipping and receiving doors.
- Bring cleaning personnel in during the working day or as soon after as possible to minimize lighting and HVAC costs.

Water & Wastewater

- Recycle water, particularly for uses with less-critical quality requirements.
- Recycle water, especially if sewer costs are based on water consumption.
- Balance closed systems to minimize flows and reduce pump power requirements.

  Eliminate once-through cooling with water.

Use the least expensive type of water that will satisfy the requirement.

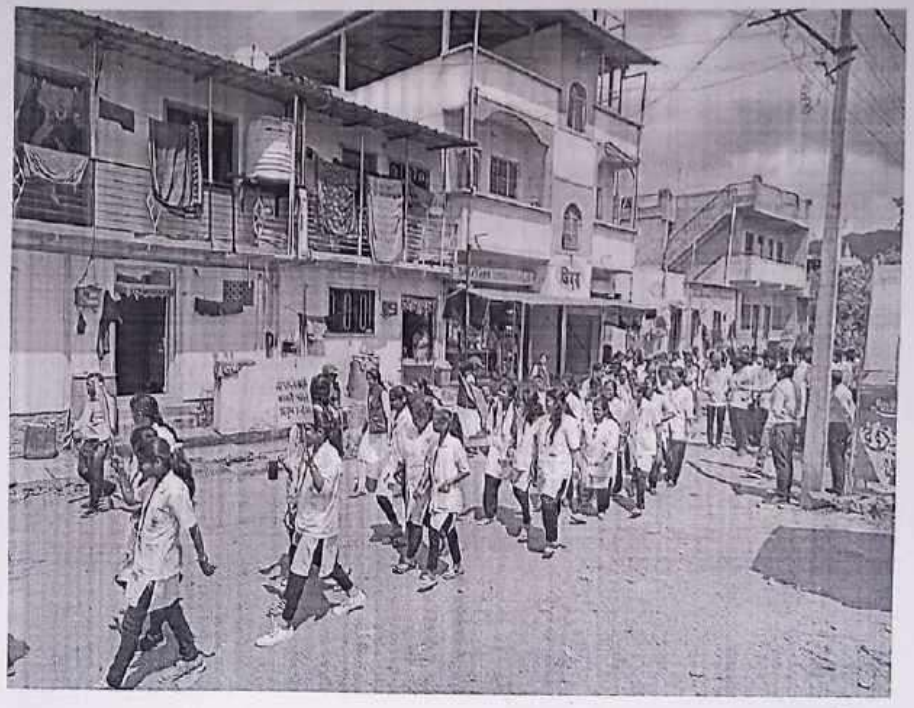
Fix water leaks.

- Test for underground water leaks. (It's easy to do over a holiday shutdown.) Check water overflow pipes for proper operating level.
- Automate blow down to minimize it.
- Provide proper tools for wash down -- especially self-closing nozzles.
- Install efficient irrigation.
- Reduce flows at water sampling stations.
- Eliminate continuous overflow at water tanks.
- Promptly repair leaking toilets and faucets.
- Use water restrictors on faucets, showers, etc.
- Use self-closing type faucets in restrooms.
- Use the lowest possible hot water temperature.
- Do not use a heating system hot water boiler to provide service hot water during the cooling season -- install a smaller, more-efficient system for the cooling season service hot water.
- If water must be heated electrically, consider accumulation in a large insulated storage tank to minimize heating at on-peak electric rates.
- Use multiple, distributed, small water heaters to minimize thermal losses in large piping systems.
- Use freeze protection valves rather than manual bleeding of lines.
- Consider leased and mobile water treatment systems, especially for deionized water.
- Seal sumps to prevent seepage inward from necessitating extra sump pump operation.
- Install pre-treatment to reduce TOC and BOD surcharges.
- Verify the water meter readings. (You'd be amazed how long a meter reading can be estimated after the meter breaks or the meter pit fills with water!)
- Verify the sewer flows if the sewer bills are based on them

Miscellaneous

- Meter any unmetered utilities to know what normal efficient use is. Track down causesof deviations.
- Shut down spare, idling, or unneeded equipment.
- Make sure that all of the utilities to redundant areas are turned off -- including utilitieslike compressed air and cooling water.
- Install automatic control to efficiently coordinate multiple air compressors, chillers,cooling tower cells, boilers, etc.
- Renegotiate utilities contracts to reflect current loads and variations.
- Consider buying utilities from neighbours, particularly to handle peaks.
- Leased space often has low-bid inefficient equipment. Consider upgrades if your leasewill continue for several more years.
- Adjust fluid temperatures within acceptable limits to minimize undesirable heat transferin long pipelines.
- Minimize use of flow bypasses and minimize bypass flow rates.
- Provide restriction orifices in purges (nitrogen, steam, etc.).
- Eliminate unnecessary flow measurement orifices.
- Consider alternatives to high-pressure drops across valves.
- Turn off winter heat tracing that is on in summer.

Beyond the campus environmental promotion activities
Document Proofs



Yashoda Technical Campus 6757 Satara

Principal
Yashoda Technical Campus
Faculty Of Pharmacy

YASHODA TECHNICAL CAMPUS 6757 SATARA

DIRECTOR
Yashoda Technical Campus
Satara

Yashoda Shikshan Prasarak Mandal's
Yashoda Technical Campus, Satara
Faculty of Engineering
Department of Electrical Engineering

Report on event World Ozone Day 16th September, 2022

Department: Conducted and organized by Degree Electrical Engineering

Date of Conduction: 16th September, 2022

Participated by: Entire YTC Campus

Venue: Yellow Seminar Hall

Time: 3.00 pm onwards

Student Coordinators:

1) Ashitosh kharshikar (TY-B.Tech)
2) Shivankar Abhijeet (FY-B.Tech)
3) Prasad Nalawade (FY-B.Tech)
4) Ajinkya Bande (TY-B.Tech)
5) Parag Kulkarni (TY-B.Tech)
6) Aman Mulani (TY-B.Tech)
7) Aishwarya Kale (TY-B.Tech)
8) Yash Pawar (TY-B.Tech)

Faculty Coordinator:- Mr. S. U. Bagwan

Name of Event Guest: Mr. Jalindar P. Kashid, President, Enviro Friends Nature Club, Member of District Environment Government Committee, Satara

Highlight of Events:

The event was started with sarawati pujan by Dr. D. S. Badkar - Principal, Mr. Jalindar P. Kashid, All Heads, and Mr. S. U. Bagwan at 3.00 pm. The felicitation of the guest Mr. Jalindar Kashid has done by the honorable principle Dr. D S Badkar. Mr. Jalindar Kashid has addressed the importance of ozone layer to our earth. He has discussed that the ozone layer is a natural part of our atmosphere. It acts like a protective sun screen by blocking harmful ultraviolet rays from the sun. Certain chemicals such as chlorofluorocarbon, Hydrochlorofluorocarbon, and halons can damage the ozone layer. These can cause holes to form in the layer and allow more ultra-violate rays to reach the earth's surface. As a result of ozone layer depletion there will be increase in earth's temperature, melting of glaciers, cancerous diseases, rise in the level of ocean and many more. He has highlighted how every individual participate in saving ozone layer in day to day activity by planting trees, saving natural resources, using green energy etc. The principal has also shared valuable information on world ozone day. Prof. S. U. Bagwan has given vote of thanks by thanking management, Principal, Event Guest, All heads, Students and Peons for

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DIRECTOR
Yashoda Technical Campus
Satara

making the event successful. Lastly, the event was concluded with Pasaydan. Approximately 200 students have attended this event enthusiastically.

Following budget for Celebration of World Ozone Day Celebration on 16th Sept, 2022 was sanctioned by the management. The details are as follows,

Sr. No.	Particulars	Amount (in Rs.)
1	Guest Remuneration	1000/-
2	Event Flex	700/-
Total		**1700/-**

The photographs of this event are attached in this report.

Head of Department

H.O.D.
Electrical Engineering
Yashoda Technical Campus, Satara

Yashoda Technical Campus Satara 6757

DIRECTOR
Yashoda Technical Campus
Satara

Event Photos

Yashoda Technical Campus • Satara 6757

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Electrical Engineering
Yashoda Technical Campus,Satara

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Faculty of Engineering

Under NSS

AND

Azadi Ka Amrit Mahotsav

Tree plantation Drive

Report

Date: 07th Jul. 2022 Time: 10:50 AM

As a part of celebration of Azadi ka Amrit mahotsav, Yashoda Technical Campus along with HDFC Bank, Satara Branch has arranged a Tree Plantation Drive on 07/07/2022. Associate Director and Head MBA department Prof. R.D. Mohite sir introduced and felicitated the guests by the hands of President Hon. Prof. D. B. Sagare sir, Vice President Hon. A. D. Sagare sir, Registrar, Mr. Ganesh Survase sir and Principal Engineering Prof. Dr. D. S. Badkar Sir.

Chief Guests from HDFC Bank, Satara Branch were present for the same and felicitated by YTC, authorities and staff with warmful welcome into the YTC, Campus, Satara. Under the theme of Azadi ka Amrit mahotsav, HDFC Bank, Satara Branch is aiming to plant more and more plants to deliver the safe and clean environment in the region. In this drive more than 40 plants have been planted by the hands of officers from the HDFC Bank, Satara Branch and it is halped by the space and helping hands of YTC, Satara authorities. Teaching and Non-teaching staff and students of YTC, Satara.

President Hon. Prof. D. B. Sagare sir, Vice President Hon A. D. Sagare sir, Prof.R. D. Mohite, Prof. J.H.Patel sir and all the staff members of Engineering and Pharmacy alongwith non teaching staff were present for the Tree Plantation Drive. NSS coordinator, YTC, Engineering Mr. P. G. Borate coordinated the activity. Prof. R.D. Mohite sir concluded the drive with vote of thanks.

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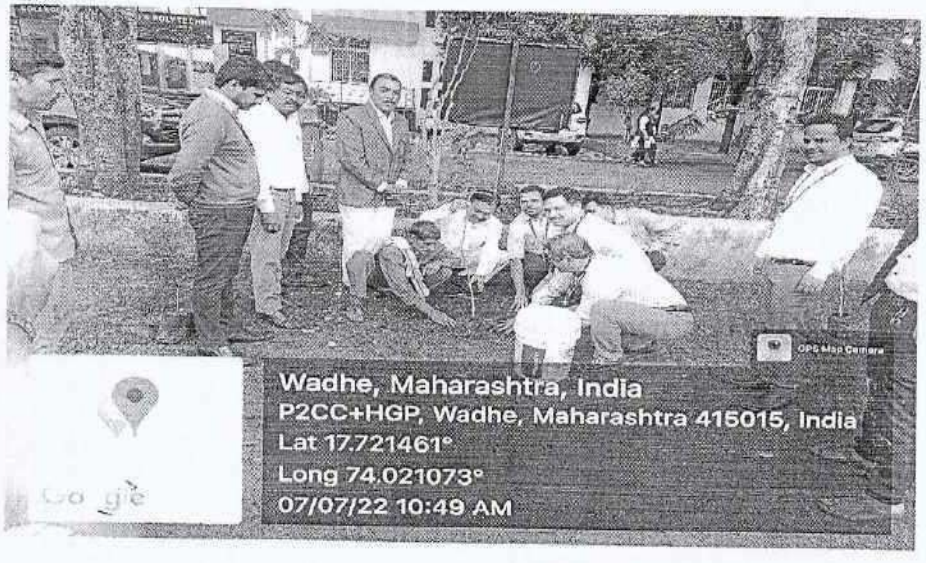
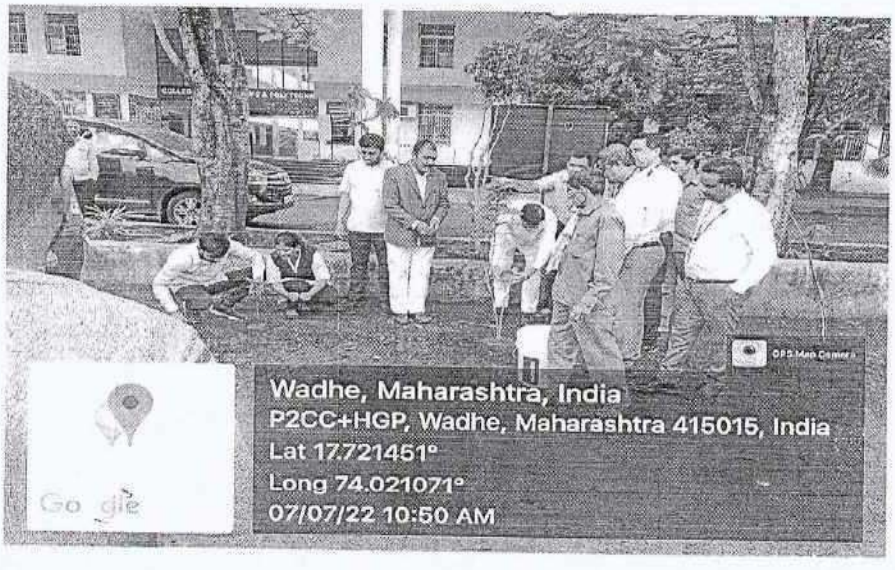
Faculty of Engineering



President Hon. Prof. D. B. Sagare sir with HDFC bank Officers while doing Plantation



President Hon. Prof. D. B. Sagare sir with YTC, Students while doing Plantation

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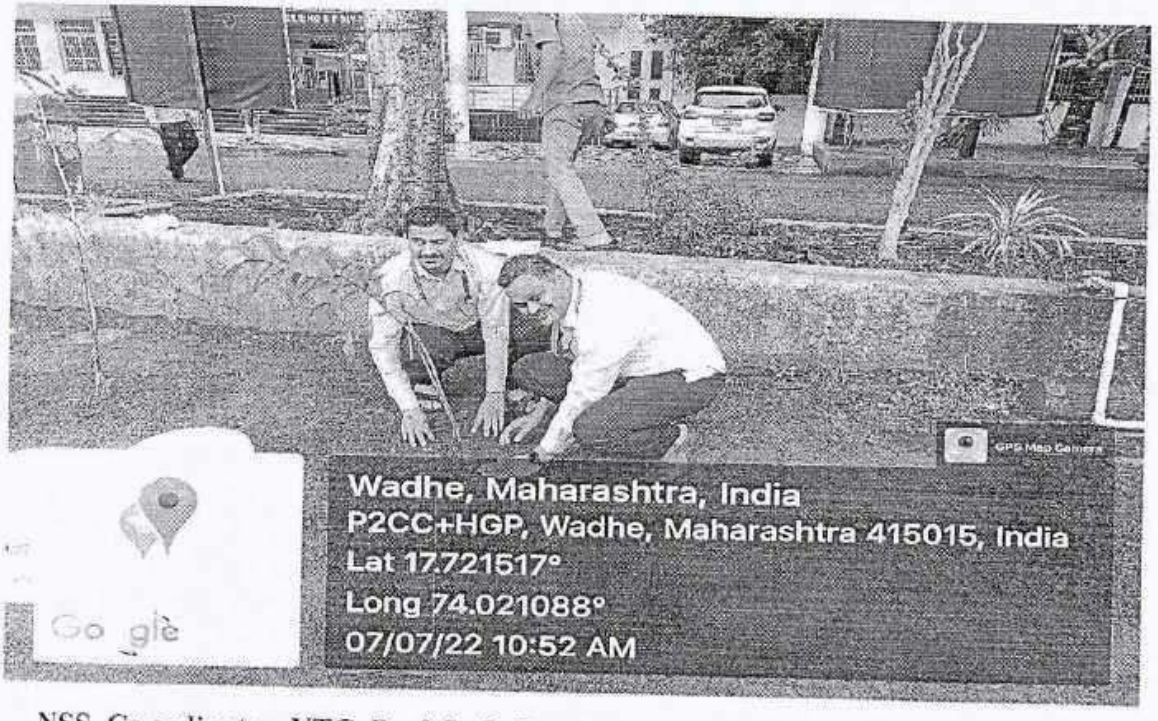
Faculty of Engineering



NSS, Co ordinator, YTC Prof. P. G. Borate and YTC, Staff while doing Plantation

NSS, Coordinator
YTC, Engg.

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Principal
Yashoda Technical Campus,Satara
Faculty of Engineering & Polytechnic

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DIRECTOR
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Satara

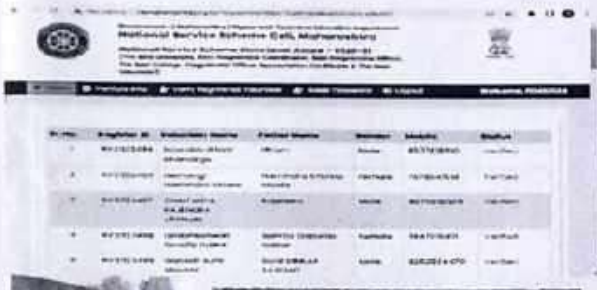
YSPM

YSPM's
Yashoda Technical Campus,
Faculty of Pharmacy, Wadhe, NH-4, Satara
NSS COMMITTEE

Date- Feb 2022

Report of NSS Majhi Vasundhara Yojana activity 2021-22

NSS unit of YSPM's Yashoda technical campus, Faculty of Pharmacy (B.Pharm.) participated in Majhi Vasundhara Yojana. Under this scheme all students of NSS unit registered on www.nssmaharasthra.org.in portal. On this portal all students take e-pledge through their login created at web portal & uploaded the photo of tree plantation that they have been planted in their area.e-Pledge & tree plantation were verified on website by NSS officer Mr. Vishal Mohite. All students are participated in this activity. This activity conducted online as per directives coordinator / Directors of NSS maharasthra as per circular received.



On behalf of Yashoda Technical Campus, Faculty of Pharmacy, The Activity is coordinated by **Mr.Vishal R. Mohite**, Asst. Professor, NSS Officer under the valuable and precious guidance of B.Pharm HOD **Mr. A.M. Bhagwat** and Principal **Dr. V. K. Redasani**.

President Hon. **Dasharath Sagare Sir** and Vice-president, Hon. **Ajinkya Sagare Sir** congratulated and enlightened that this will act as supportive in aiding student's extracurricular interest and as part of personality developement. This will also help the students to increase probability of getting selected in different job profile

Report prepared by:- Mr. V. R. Mohite

Principal-

Yashoda Technical Campus 6757 Satara

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DIRECTOR
Yashoda Technical Campus
Satara

YSPM's

Yashoda Technical Campus, Satara

Environment Preservation Awareness Session

Under

AZADI KA AMRIT MAHOTSAV

RESOLVE@75

Report

Date: 22nd March 2022 Time: 11:00 AM

As a part of celebration of Azadi ka Amritmahotsav, Yashoda Technical Campus, Faculty of Engineering arranged a guest lecture on Environmental Preservation Awareness under Resolve@75 on Tuesday, 22/03/22.

Mr. Soham Kulkarni and Mr. Akshay Puranik from Sagar Mitra Abhiyaan presented the dangers caused by negligent disposal of plastic and its recycling. The students were informed about the work carried out by Sagar Mitra along with Swechhandi, V care and Robinhood army. Mr. Soham Kulkarni shared his thoughts about plastic accumulating in our oceans and on our beaches has become a global crisis. Billions of pounds of plastic can be found in swirling convergences that make up about 40 percent of the world's ocean surfaces. Plastics pollution has a direct and deadly effect on wildlife. Thousands of seabirds and sea turtles, seals and other marine mammals are killed each year after ingesting plastic or getting entangled in it. Sagar Mitra have solution on this waste plastic. Student took pledge about reducing the usage of plastic in day to day life. Director Dr. V. K. Redasani, Mr. R. D. Mohite, Dr. Mrs. R. P. Kulkarni and all the staff members of Engineering and Pharmacy along with Engg and pharmacy students were present for the lecture. Mr. P.P. Nimbalkar coordinated the activity. Mr. P. G. Borate concluded the program with vote of thanks.

No. of students Present: 96

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Yashoda Technical Campus
Satara

Report On

Tree Plantation 2022

6/7/2022

MCA Department has organized the Tree Plantation activity in July 2022. Alongside all Yashoda Technical campus the event has been successfully completed.

Firstly the Tree plantation activity is supposed to happen to give awareness about the how our lives are worthless without the plants. The motive behind such social activities is giving the importance of plantation to each and every one. It should be our first prior duty to make a tree plantation. At least one plant yearly we are supposing to planting tree.

All the faculties alongside students have given their huge involvement into the Tree plantation. The founder of Yashoda Technical campus Hon.Dasharath Sagare Sir has given the importance of Tree plantation.

The HOD of the MCA department has given the small basics of planting a tree. She described, now a days the trees are become the vital part of our regular life, in accordance to make our environment pure we need to plant more trees. And also the exceeding range of global warming is affecting our environment into bad manner so that to cure our environment we need to plant more trees.

Students also take a pledge to plant at least 2 plants and nurture then in well manner. Also this activity is very inspiring and social so that they were so involved into it.

H. O. D.
YSPM's YASHODA TECHNICAL CAMPUS, SATARA
FACULTY OF MCA

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DIRECTOR
Yashoda Technical Campus
Satara

Photos of Event:

YSPM's YASHODA TECHNICAL CAMPUS, SATARA

DIRECTOR
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Satara

Yashoda Shikshan Prasarak Mandal's

Yashoda Technical Campus, Satara

FACULTY OF MBA

(2)

Report of Guest Lecture

Day –Saturday, 29/08/2020

Time: 1:00 PMTO 3.00PM

Venue: On-line Guest Lecture Session

Name of Guest: Shri.Dnyaneshwar Chavan Sir.

Organization: Art of Living

Designation: Teacher of Art of Living

Work Experience: Vast motivational Training experience

Topic for the session: Benefits of Art of Living course

Content of the session:

Shri.Dnyaneshwar Chavan sir introduced the important concept about Art Of Living. The Art of Living foundation is a volunteer based humanitarian and educational non-governmental organization. It was founded in 1981 by Sri. Sri. Ravishankarji.The Art Of living foundation has centers in more than 156 countries. Head-quarter is located at benguluru.Shri.Dnyashwer Chavan sir explained about Sahaj Samadhi Meditation,Sri Sri Yoga, Wellness Packages. Dynamism for self and nation (DSN Program) blessing program,Utkarsha Yoga,Medha Yoga levels.Shri Dnyneshwar chavan sir explained the benefits of Art Of Living course as it nurtures leadership. creativity and team spirit through timeless wisdom, innovative processes and contemporary management techniques that help, create dynamic work place

Summary: Due to Art Of Living programs breakthrough our inhibitions, and access inner stability and power, experiences a deep state of gratitude and fullness and become aware of the grace that flows through you. Due to Medha Yoga Programs develop problem solving attitude and overcome stress.Art of Living program boost efficiency and productivity across all levels of your organization with customized programs that address the needs of every company.

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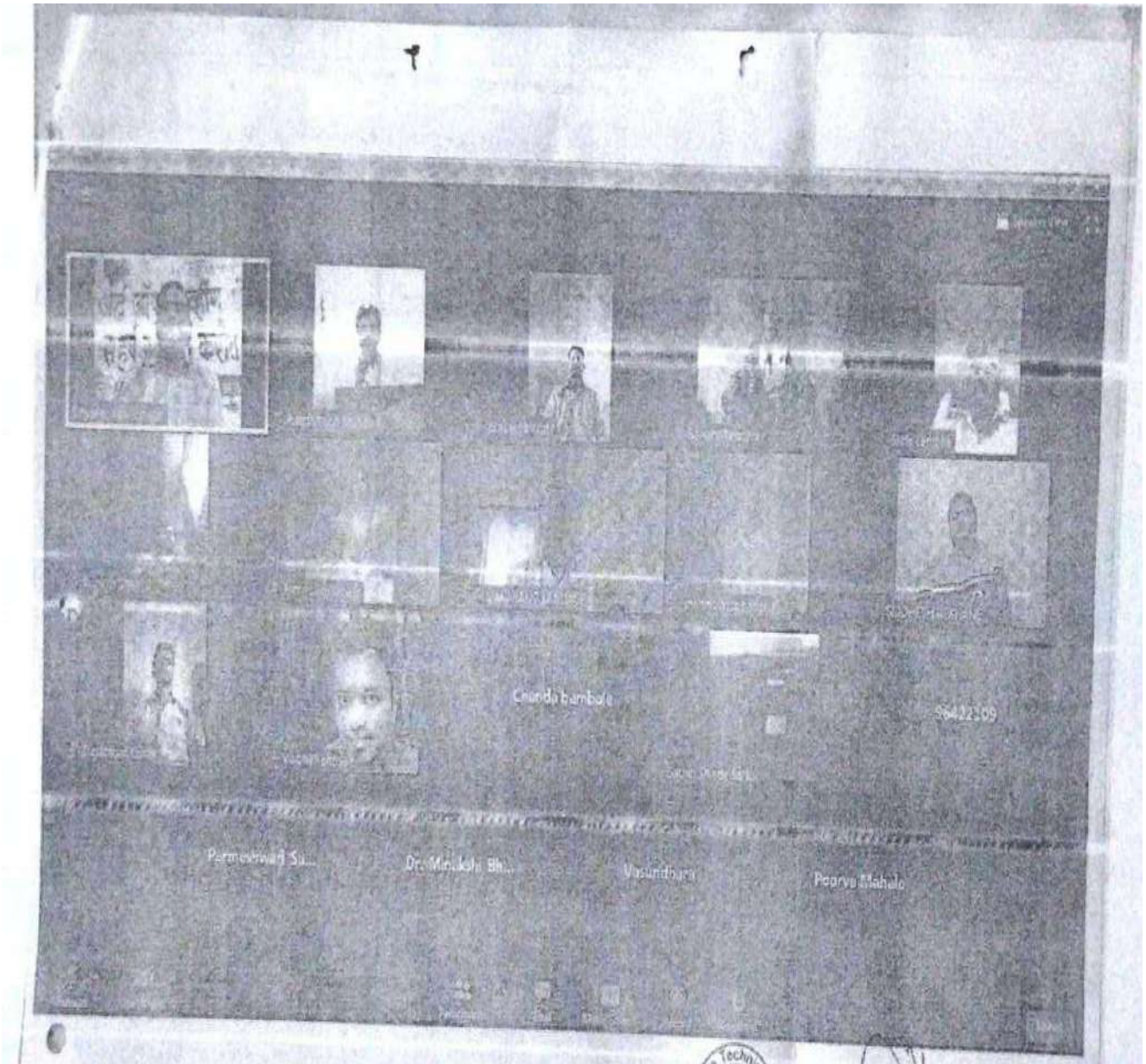

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Faculty of Engineering

Tree plantation Drive

Under NSS

AND

Azadi Ka Amrit Mahotsav

Report

Date: 18th Sep. 2021 Time: 11:00 AM

As a part of celebration of Azadi ka Amrit mahotsav, Yashoda Technical Campus along with Income tax department, Satara office arranged a Tree Plantation Drive on 18/09/2021. Prof. J.H.Patel sir introduced and felicitated the guests by the hands of Vice President Hon. A. D. Sagare sir.

Chief Guests from Income tax department, Satara office were present for the same and felicitated by YTC, authorities and staff with warmful welcome into the YTC, Campus, Satara. Under the theme of Azadi ka Amrit mahotsav, Income tax department, Satara office is aiming to plant more than 300 plants to deliver the safe and clean environment in the region. In this drive more than 30 plants have been planted by the hands of Income tax department, Satara office and it is halped by the space and helping hands of YTC, Satara authorities, Teaching and Non-teaching staff and students of YTC, Satara.

Vice President Hon A. D. Sagare sir, Prof.R. D. Mohite, Prof. J.H.Patel sir and all the staff members of Engineering and Pharmacy alongwith non teaching staff were present for the Tree Plantation Drive. NSS coordinator, YTC, Engineering Mr. P. G. Borate coordinated the activity. Prof. J.H.Patel sir concluded the drive with vote of thanks.

Technical Campus * 6757 * Yashoda * Satara

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Faculty of Engineering

Vice President Hon A. D. Sagare sir while doing Plantation

Vice President Hon A. D. Sagare sir and Income tax Personnel while doing Plantation

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Faculty of Engineering

Guest's Felicitation by Vice President Hon A. D. Sagare sir and Prof. J.H.Patel sir

Vice President Hon A. D. Sagare sir and Income tax Personnel while doing Plantation

NSS, Programme Coordinator
YTC, Engg.

DIRECTOR
Yashoda Technical Campus
Satara

REPORT
YASHODA TECHNICAL CAMPUS, SATARA
VISIT AT SATARA BAMBOO PLANT
DEPARTMENT OF CIVIL ENGINEERING
B-TECH

YASHODA TECHNICAL CAMPUS 6757 SATARA

DIRECTOR
Yashoda Technical Campus
Satara

The department of Civil Engineering, Yashoda Technical Campus, Satara, organized a One hour educational visit on bamboo trees plantation at Wadhe Phata,Satara on 7 th August 2023 for B-Tech Civil engineering students. Site visit was organized as per Dbatu University guidelines and recommendations regarding syllabus of B-Tech Civil Engineering.

Visit was organized with the prior permission & by the initiative and hard efforts of head of Civil Engineering department Prof.C.B.PATIL, & subject teacher Prof.P.G.BORATE, guided the students. Students of B-Tech, Civil took hard efforts and initiative under the continuous guidance of Prof.P.G.BORATE, which makes this visit a grand success.

- ❖LOCATION :- Wadhe Phata ,Satara
- ❖DAY &DATE :-Monday , 7th AUGUST 2023
- ❖GUIDE BY :- Prof. P.G.BORATE.

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BAMBOO

Bamboos popularity has risen in recent years fuelled by its myriad of practical uses and aesthetic features. Bamboo is the fastest growing and most versatile plant in the world with many nations depending on it for their livelihood. However, in western countries (particularly Australia), bamboo has been somewhat misunderstood and even seen as a pest due to the early introduction of so many running species

.

There are about 1500 bamboo species in the world, however approximately half of these are monopodial (running or invasive) species. It is unfortunate that in the past, so many of these running species have made it into Australian gardens, as it is these species that has tarnished the reputation and acceptance of bamboo. However with the introduction of more and more sympodial (clumping or non-invasive) species to Australia, people are slowly learning that there is a huge variety of bamboos which are perfectly safe and that will not take over your garden. With bamboo species ranging in height from 3 meters to 30 meters and in a variety of colors and shapes, there is sure to be a bamboo to suit everyone and every application.

Bamboo is the world's fastest producer of biomass and can be used for anything between production of paper or clothing, used as a building material such as flooring, bench tops, fences and screens, or even as a food source in the form of the edible shoots for your favorite curry or stir

fry. In China, bamboo leaf extract has a long history of food and medicinal applications and its potential can only be speculated in a global market. Due to the large variety of bamboo and their remarkable ability to adapt, there is a bamboo suitable for every application.

Bamboo is in fact a type of grass - a very fast growing and giant grass. Bamboo grows in a short but strong growth spurt during summer and then remains near dormant over winter. During the 'growth spurt', a bamboo will start with new shoots from the ground which will grow to full height in two to three months. Due to some of the largest bamboo species being capable of reaching over 30 meters in height, during peak growth a bamboo shoot can grow up to 1 meter per day.

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Bamboo terminology

Sympodial (Clumping): Sympodial or clumping bamboos are those that DO NOT spread and form tight clumps which only slowly expand in diameter each year.

Monopodial (Running): Monopodial or running bamboos are the dreaded bamboos that will not only take over your garden or property, but quite possibly also your neighbors. Bamboo groves of running bamboo can be very beautiful, but only in areas where space is not an issue or where they can be controlled.

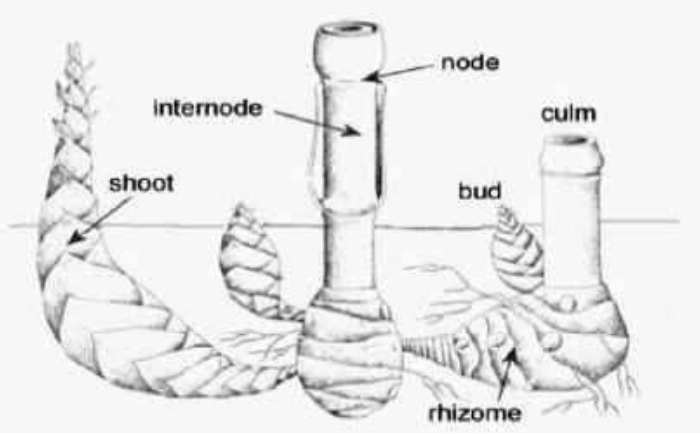
Rhizome: These are the underground stems of a bamboo from which culms, roots and other rhizomes can grow.

Culm: This is the name given to the stems of a bamboo.

Shoot: This is the name given to a young culm as it emerges from the ground from the rhizome.

Node: Nodes are the diaphragms that separate the hollow bamboo culms into compartments. These are the visible 'rings' on the bamboo culms.

Internode: The hollow sections between the nodes. These vary in length from species to species.



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Bamboo shoots for eating

Bamboo shoots is an important food source in many Asian countries with Thailand, China and Japan being the biggest consumers. Bamboo shoots are not yet part of traditional Western food, however most people have at some point eaten bamboo (perhaps without knowing it) as it is found in most curries and many other Asian dishes.

Currently, Australia imports vast quantities of bamboo shoots to supply restaurants and markets. Most of this however is in tins, despite fresh shoots being far superior and preferred among consumers. Very little of the bamboo shoots available in Austral grownin Australia, leaving an obvious gap in the market ready to be filled by the entrepreneurial farmer. As bamboo produces new shoots in summer or autumn here in Australia, corresponding to Winter time in China and Japan, there is also an opportunity for export to these countries during their off-season.

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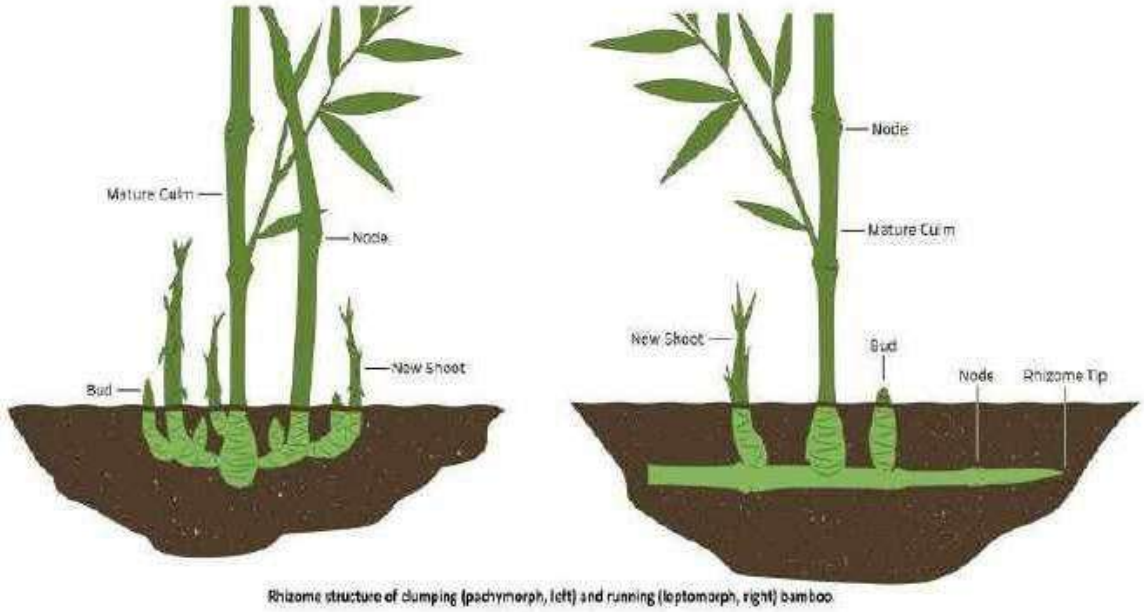
Vascular plants with **monopodial** growth habits grow upward from a single point. They add leaves to the apex each year and the stem grows longer accordingly.

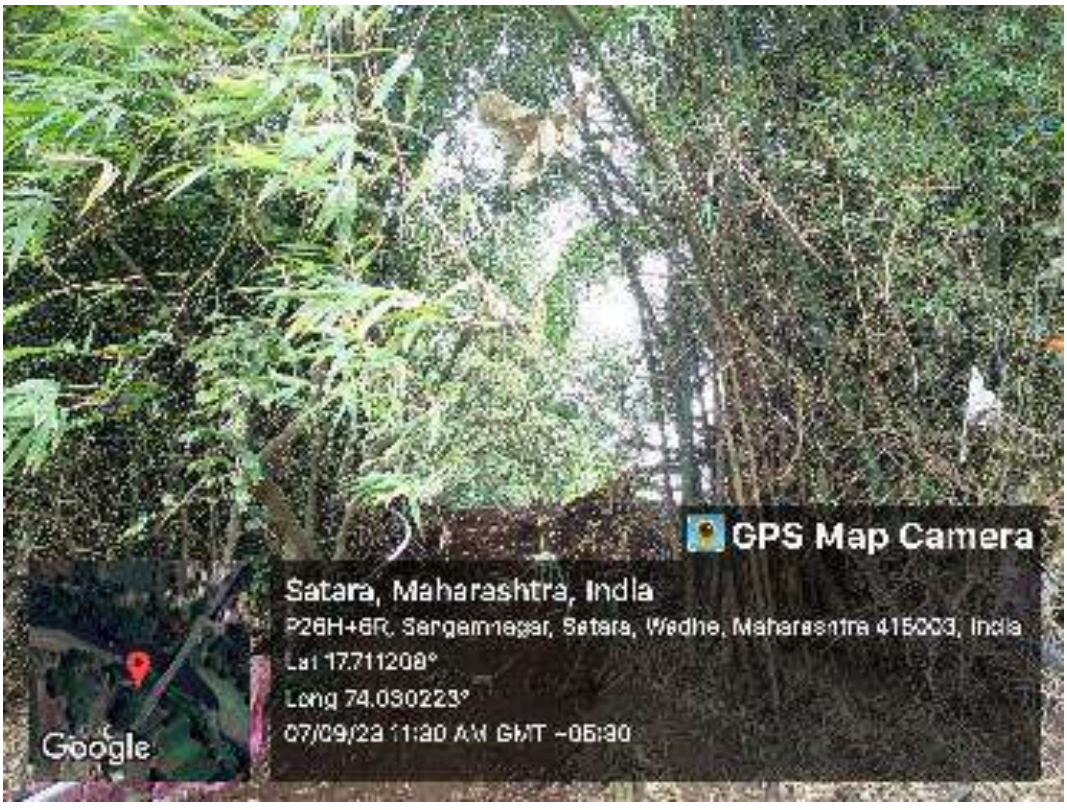
The word *Monopodial* is derived from Greek "mono-", *one* and "podial", "foot", in reference to the fact that monopodial plants have a single trunk or stem.

Orchids with monopodial growth often produce copious aerial roots that often hang down in long drapes and have green chlorophyll underneath the gray root coverings, which are used as additional photosynthetic organs. They do not have a rhizome or pseudobulbs so species adapted to dry periods have fleshy succulent leaves instead. Flowers generally come from the stem between the leaves. With some monopodial species, the stem (the rhizome) might fork into two, but for all monopodial orchids this is not necessary for continued growth, as opposed to orchids with sympodial growth.



Rhizome structure of clumping (pachymorph, left) and running (leptomorph, right) bamboo

Photographs During Visit:



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Summary

This visit covers an all the points required for the students to know about how the Bamboo how does it looks . Even during the visit we got to know about the type of bamboo & how the bamboo structure looks like and how it gets nodes,culms, shoots. And all the Information About the Bamboo Plant.

Prof.P.G.Borate (Subject Teacher) Civil dept.YTCS

DIRECTOR
Yashoda Technical Campus
Satara

Faculty of Engineering

Department of Civil

Industrial visit academic year 2021-22

Sr. No	Date	Name of industry	Purpose of visit
1.	31/12/22	Water treatment plant ,STP & solid waste treatment	Extending knowledge through industrial visit
2.	1/7/22	Water treatment plant	Understand the water treatment process

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YSPMs Yashoda Technical Campus, Wadhe, Satara Dt. 31/12/21

A VISIT REPORT ON

Water Treatment Plant, STP and Solid Waste treatment

Faecal Treatment Plant Malkapur Tal. Karad, Dist. Satara.

As per mentioned in curriculum of DBATU T.Y. B.Tech Civil Engineering Students have visited the aforesaid plant on 31/12/21 for extending the Knowledge through Industrial visit. Malkapur developed as suburban area of Karad city. Now it has 40000 plus population as per census 2010.

WTP proposal has got administrative proposal in year 2012 and completed in 2014 which was renowned by prime minister award in 2015 due its prime output of supplying 24x7 drinking water to consumer of Malkapur town. Plant has capacity to treat Raw water which is being lifted by 25 HP pumps of 03 Nos is 5MLD Most appreciated thing is all consumer get their Water bill by digital system and 100 % water bill they deposit to Municipal council.STP unit has been set & start process of municipal Waste Treatment in 2016-17 Actually it run on 2019 of 5 MLD capacity. Thickens sludge being dried in this plant by automation machine & same is sold to surrounding Area Farmers for their farm manuaring purpose, Treated waste water being used for city gardening, firefighting, road cleaning & small-scale industries.

Now in 2019-20 Municipal Council set up Faecal TP of 3MLD Which has raw organic from Septic tank being treated here.Next is Solid waste i.e Dry garbage & wet garbage treatment plant of capacity 6 Ton /day From Wet garbage municipal council gets Rs 5/ kg income. & from composting they have T type earthworm's culture which reduces decomposition process by 2-3 days. Attended students 14. Faculty attended & guidance offered by Mr. LEMBHE SS & Mrs. PAWAR VP and Er. TELE Er. BHAGVE.Students appreciated the plant and offer warm THANKS.

Subject Teacher

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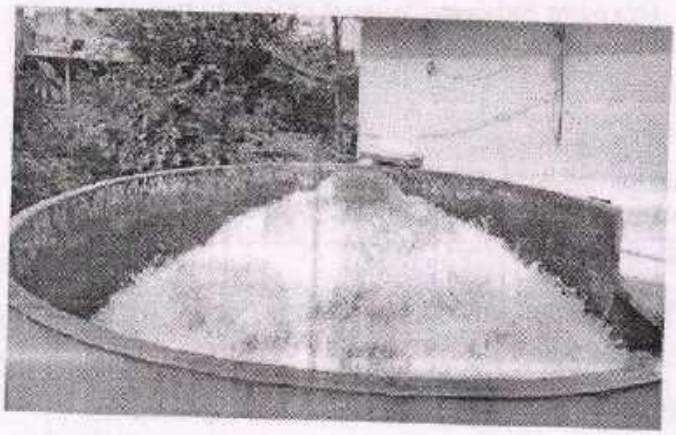

Aeration

Clari Focculator

Testing of Waste Water

Decompostin Plant

Segrigation of Dry Garbage

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Yashoda Shikshan Prasarak Mandal's

YASHODA TECHNICAL CAMPUS, SATARA

Faculty of Engineering

Department of Civil Engineering

INDUSTRIAL VISIT AT MALKAPUR TAL- KARAD DIST. SATARA

DATE OF VISIT- 01/07/2022

SY BTECH CLASS

SUBJECT ENVIRONMENTAL ENGINEERING

1) WATER TREATMENT PLANT

Students of SY B tech class, after visit to water treatment plant understood the water treatment process which is based on unit operation & unit process. This renowned plant established in 2012 for Malkapur city having population 40,000 of 5MLD. The scheme receives seven lakh liters of raw water per hour as raw water from Koyana river having 03 centrifugal pumps of 500 HP of 03 numbers.

Scheme has aeration unit – alum dosing unit- sedimentation unit (Clarifier) – filtration – disinfection unit- GSR – distribution system.

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2) SEWARAGE TREATMENT PLANT

It has capacity 5 MLD to treat municipal waste water established in 2012-13. It works on unit operation & unit process. The scheme has following units. Bar screen- Still basin chamber- pumps –macerators for grit removal – manual & automatic separators of foreign bodies – aerobic digester – sedimentation (Clarifier) – chlorination- Sludge drying unit. Students came to know after treatment of municipal waste being tested to its acceptable parameters.

Sludge is given to nearby farmers as maneuver for Rs 3/- per 1000 kg. and water after treatment supply to nearby farms free of cost.

3) FECAL TREATMENT PLANT

New concept, sludge after digestion from each septic tank transported on treatment site 3000 kg of three times in a Day. Units are storage tank of 10,000 kg. – Pumps- storage cilo of each 1000 lit. 03 numbers.

Digestion unit with aerobic – sludge for compost by Tiger worms – water supply to inlet of STP.

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4) DRY & WET GARBAGE PROCESS

DRY GARBAGE PROCESS

Collection – segregation – making classification – packaging – sale to vendor

Every day 5 tone of dry garbage received form 'Ghanta Gadi 'Out of which 3 tone as dry garbage Processed here.

WET GARBAGE PROCESS

Wet garbage process plant runs on Two toe automation process of removing moisture work under solar power of 1360 units required per day. Wet sludge sale per day 13 tones at cost Rs 3per kg as fertilizer

After successful completion of visit students reached at campus on same day at 4:00 pm in campus.

Mr. LEMBHE S .S.

ENV subject Teacher

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Each working unit students observed carefully and got the knowledge of how bacteria free wholesome Water supplied to consumers of Malkapur citizens.

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CHARACTERIZATION AND REMOVAL OF WATER HYACINTH FROM KRISHNA RIVER AT WAI TAL-WAI DIST- SATARA BY EFFECTIVE AND ECONOMIC EQUIPMENT

Prof. Lembhe Sunil S*1, Ms. Kenjale Rutuja Vikas*2, Ms. Nikam Shweta Anil*3, Ms. Khatmode Pallavi Pandurang*4, Mr. Pawar Vinayak Anil*5, Mr. Chavan Arun Dashrath*6, Mr. Gole Pranav Ganpat*7

*1Guide, Civil Engineering Department, Yashoda Technical Campus, Satara, Maharashtra, India.

*2,3,4,5,6,7Students, Civil Engineering, Yashoda Technical Campus, Satara, Maharashtra, India.

ABSTRACT

Water hyacinth (Eichhornia crassipes) is rapidly growing plant that affects aquatic plant, animals, ecosystem, navigation etc. It is also block water ways, decrease amount of dissolve oxygen. The growth rate of Eichhornia crassipes can be controlled by using chemical, biological and mechanical methods. In chemical method herbicides are use but they adverse effect on living things. Biological method is too much lengthy process & available mechanical method are very expensive. Hence the goal of our project is to develop the economical equipment to remove water hyacinth from water bodies at Ganpati ghat of wai. Equipment consist of 60&300 rpm 12 V DC motors, base frame 101cmX56cm, pvc pipes (Dia-75&140mm), bearing, shaft, conveyor belt, 12V battery, propeller.

Keywords: Water Hyacinth, Mechanical Removal, Ecosystem, Eichhornia Crassipes.

I. INTRODUCTION

Nowdays water hyacinth seems very critical problem water hyacinth is originated in the amazon basin and spread throughout the world its growth potential is very rapid as compared to any other aquatic plants its leaves are thick and ovate in shape this are 10 to 20cm across on the long stalk it has unbranched roots and also consist root cap it reproduces with both sexually as well as vegetative propagation Its profilic growth date causes blockages in water bodies it is problematic for navigation and entire aquatic life its also causes depletion of basic oxygen level in water bodies and contamination of water.

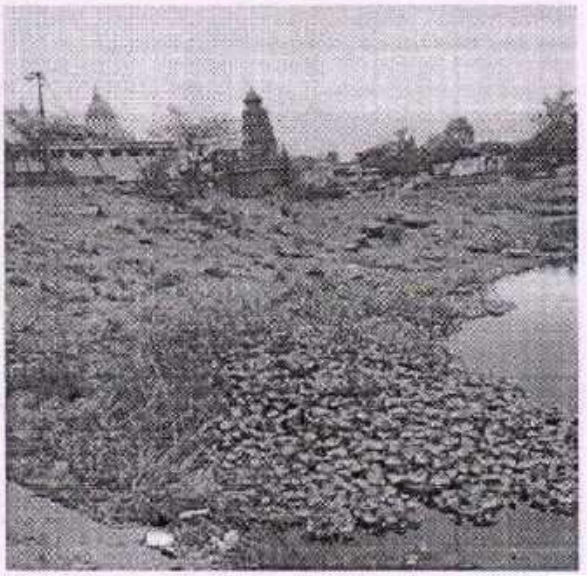

Fig 1: Water hyacinth mat at Krishna river Wai

There are some mechanical, chemical & biological methods are already avail
Mechanical method is very expensive so it is not convenient to in rural areas a
of chemicals has we know chemicals has adverse effects on the rest of the aqu
contaminating the water.

Yashoda Shikshan Prassarak Mandal,

Yashoda Technical Campus, Satara.

Tal: Satara, Dist: Satara

A VISIT REPORT ON

'STP unit Malkapur

Malkapur Nagar panchayat Malkapur Tal: Karad, Dist:SATARA'

11/02/2019

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DIRECTOR
Yashoda Technical Campus
Satara

YSPMs YTC NH 04 Wadhe, SATARA.

Visit report on

"Visit to STP unit at Malkapur, Tal. Karad, Dist.**SATARA**"

arranged on, 11th February 2019

Yashoda Shikshan Prasarak Mandal's Yashoda Technical Campus, Faculty of Civil Engineering Wadhe Phata Satara have organized industrial visit on "STP unit at Malkapur, Tal. Karad, Dist.**SATARA**" on 11th February 2019 , at 02:30 pm.

The objectives of visit are to understand the basic units included in sewerage Treatment plant. Necessity, functioning, & its suitability to local society to achieve Environmental significance.

The highlights of the visit are to understand the students basic Units of STP: Capacity- 5 MLD, primary, secondary, & tertiary process.

coarse Screen, sump , swage pumps 03 nos. storage tanks. Fine screens with manual & mechanical method, macerator, and artificial aeration tank with seeds, 02 tanks. Secondary clarifier with coagulation tank. Disinfection tank, sludge thickening & disposal. Finally taken information of drawing & design parameters Of each units. Laboratory testing of treated sewage & their acceptable values. Students ask questions and satisfactorily got answers from Mr. TELE sir plant Engineer & prof. LEMBHE sir along with Miss Kumbhar S.B.

Student Attended T.E.CIVIL - 33

Faculty – Mr. Lembhe S.S.

Miss. Kumbhar S.B.

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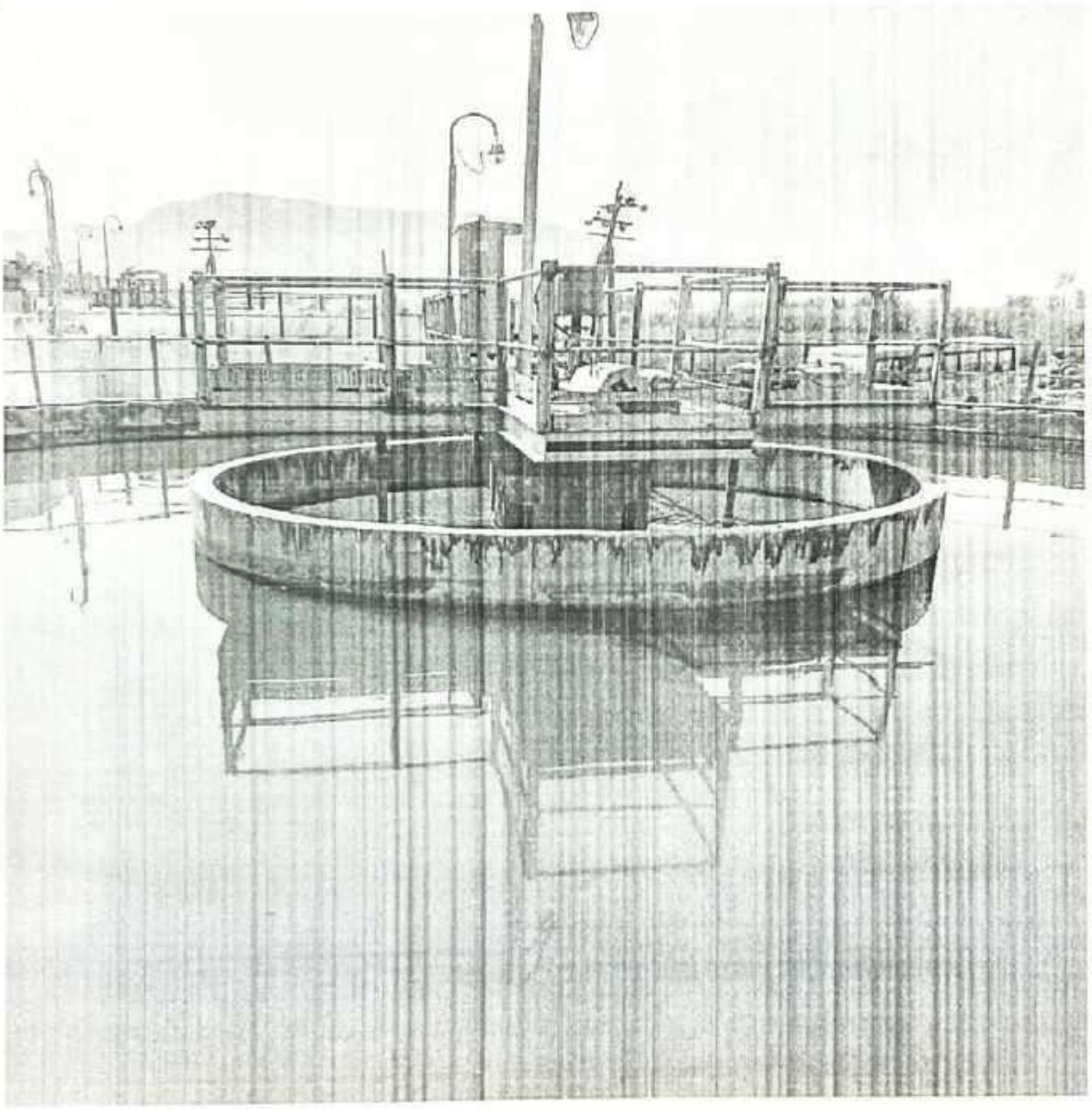

FIG NO 02 Coagulation and Sedimentation Clarifier

Visit to MALKAPUR STP Unit 05 MLD Capacity.

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FIG NO 03 sewage before treatment and after Treatment

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Satara

Report written & submitted by :- Mr. Lembhe S.S (Subject-EEN-II)

Enclosure :- 1) Detailed Report, one page Report.
2) Attendance of student.
3) Undertaking of students.
4) Permission letter (OL) - from CEO, Malkapur
5) YSS, YTC, वाहन मागणी अर्ज.

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One Page Report of Visit at Malkapur ETP Unit KARAD Dist. SATARA

Visit Place- Malkapur Nagarpanchyat Malkapur Tal:- Karad,Dist:- satara.

Visit Date-: 11/02/2019

Purpose of Visit-:

1) To study each units of ETP.
2) To know adoptability of suitable treatment on municipal waste water.
3) To study treatability of domestic waste.
4) To Study doses preferred in secondary & tertiary stages.
5) To study necessity of unit operation & unit process.
6) To study & aware environmental significance of ETP/STP units.

In this visit, students study the necessity of treatment on municipal waste water. In this visit students understand primary, secondary and tertiary units. Students came to know about each unit design, doses of coagulants, microbial culture used, sludge removal& its disposal methods.

Student observes details of bar screen, macerator, grit removal, sludge removal, alum

Dose finalization by Jar test, scum removal, de nitrification, sludge thickening & testing of effluent before discharge into river koyana.

Outcome of Visit-:

1) **After visit they get familiar with all the units involved in ETP .**
2) **They studied the treatability of municipal waste water.**
3) **They understand adaptability of suitable units& their functioning.**
4) **They studied various methods of disposal of sludge & waste water.**
5) **They studied environmental significance of each unit.**

11/02/19

Prof. LEMBHE S.S.
Subject teacher.

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YSPM YTC College of Engineering NH4 Wadhe, SATARA

DEPT OF CIVIL ENGINEERING

Academic Year-2018-19 11/02/2019

T.E. Civil Roll Call

Roll No	Name of Student	Before visit sign of student	After visit sign of student.
1	/KAMBLE PRAGATI SHASHIKANT		
2	/KATTE KAJAL RAJENDRA		
3	/PAWAR ANAJALI NAMDEV		
4	BELLARE SHUBHAM MOHAN		
5	BHOSALE VINOD PAWAN		
6	/CHAVAN ARCHANA POPAT		
7	CHAVAN ROHAN RAHUL		
8	CHAVAN ROHIT DIPAK		
9	/DESHMUKH NAMRATA PRAVIN		
10	/GHARGE KOMAL VIKAS		
11	JADHAV TEJRAJ SAMPATRAO		
12	JAGADALE RANJIT BHANUDAS		
13	KADAM ROSHAN RAVINDRA		
14	KAMBALE RAJAT SURESH		
15	KHAN SOHEL NAJIR		
16	KUDALE PRATIK VIJAY		
17	/YADAV PRAJAKTA SHANKARRAO		
18	/WAGH NEHA BALKRISHNA		
19	/KORDE SUPRIYA SURENDRA	AB	AB
20	MAGDUM OMKAR MAHAVIR	AB	AB
21	MAHANGADE ABHIJIT PRAKASH	AB	AB

11/02/19
Subj Teacher

Yashoda Technical Campus Faculty of Engg.(Civil) Satara

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Satara

22	MULLA AMIN AAYUB		
23	PATIL NIKHIL VILAS		
24	PATIL ROHIT EKANATH		
25	PATIL YOGESH KESHAV		
26	PAWAR AKSHAY MUGUTRAO		
27	PAWAR DHANASHRI ANKUSH		
28	SALUNKHE DIPALI PRAVIN	AB	AB
29	SALUNKHE SAURABH MANSING		
30	SHETE PALLAVI SHRIYAL		
31	SHINDE AMEY RAMESH (P)	Y.D	Y.D
32	SUPEKAR AKASH RAJENDRA		
33	SUTAR GITANJALI BABURAO		
34	VIDHATE SHUBHAM HEMANT		
35	YADAV RAKESH SOPAN		
36	KIRDAT VAIBHAV SURESH	AB	AB
37	HOL SHUBHAM SHARAD	Y.D	Y.D
38	MORE SUYOG VIJAY	Y.D	Y.D
39	RAUT ANKITA RAJENDRA	Y.D	Y.D
40	PITALE SHWETA DILIP	Y.D	Y.D
41	SHELAR UDAYAN SHASHIKANT	AB	AB
42	DARSHANE VIRAJ SANJAY	AB	AB
43	PANASKAR CHINMAY VILAS		
44	BADADARE SAKSHI SUNIL		
45	KAMANE DNYANESHWARI PRASHANT		

Shw. 33 present · 07 Absent

Subject Teacher

Prof. Lembhe S.S.

HOD

Civil Degree

Yashoda Technical Campus
Faculty of Engg.(Civil)

YSPM,s Yashoda Technical campus

Yashoda college of Engineering , NH4 Wadhe ,SATARA

Department of Civil Engineering

Letter of Undertaking for Industrial Visit given by Students

Date: 11th February 2019

To,
The Principal,
Faculty of Engineering,
Yashoda Technical Campus, Satara.

Sub: Undertaking for Industrial Visit to ETP unit MALKAPUR.

Tal:- Karad, Dist:- SATARA.

Dear Sir,

We are the students of third year, Department of Civil engineering in YTC, Satara herewith voluntarily submitting the under taking.

We, the undersigned students are aware that, the **college shall not be held responsible in the event of any misfortune or accidents and/or personal injuries during the visit.**

Yours sincerely,

Roll No	Name of Studen	Contact Number	Sign. of student
1	/Kamble Pragati Shashikant	9637948836	Pkamble
2	/Katte Kajal Rajendra	7719004758	Kkatte
3	/Pawar Anajali Namdev	8275196454	Apawar
4	Bhilare Shubham Mohan		
5	Bhosale Vinod Pawan		
6	/Chavan Archana Popat	8669524890	Chavan.
7	Chavan Rohan Rahul	919373740467	Rchavan
8	Chavan Rohit Dipak	8975400429	RchavaN
9	/Deshmukh Namrata Pravin	7058641257	Ndeshmukh
10	/Gharge Komal Vikas	7700007919	Kgharge
11	Jadhav Tejraj Sampatroa	7058970007	
12	Jagadale Ranjit Bhanudas	7755994042	
13	Kadam Roshan Ravindra	7083880143	Rkadam
14	Kambale Rajat Suresh (P)		

14	Khan Sohel Najir	9145563937	Sukhan
16	Kudale Pratik Vijay		
17	/Yadav Prajakta	9373795032	Prajakta
18	/Wagh Neha	7262053314	Wagh
19	/Korde Supriya		
20	Magdum Omkar Mahavir		
21	Mahangade Abhijit Prakash		
22	Mulla Amin Aayub (P)		
23	Patil Nikhil Vilas	9922813828	N. V. Patil.
24	Patil Rohit Ekanath	8975897172	Rohit
25	Patil Yogesh Keshav	+917676465102	
26	Pawar Akshay Mugutrao		
27	/Pawar Dhanashri Ankush	918048247066	
28	/Salunkhe Dipali Pravin		
29	Salunkhe Saurabh Mansing	7770039712	
30	/Shete Pallavi Shriyal	9763990193	Shete
31	Shinde Amey Ramesh (P)		Absent YD
32	Supekar Akash Rajendra	9922016670	
33	/Sutar Gitanjali Baburao	7517992907	Sutar
34	Vidhate Shubham Hemant	9637630168	Vidhate
35	Yadav Rakesh Sopan		
36	Kirdat Vaibhav		
37	Hol Shubham		Absent YD
38	More Suyog		Absent YD
39	/Raut Ankita (P)		Absent YD
40	Phalke Sweta Dilip		
41	Shelar Udayan Shashikant		
42	Darshane Viraj Sanjay		
43	Panaskar Chinmay Vilas	7775968929	
44	/ Badadare Sakshi Sunil	9168913603	Badadare
45	/ Kamane Dnyaneshwari Prashant	9673133145	

Faculty of Engg.(Civil)

YSPM's

Yashoda Technical Campus, Wadhe, NH-4, Satara

Faculty of civil Engineering.

YSPM/ YTC/ [illegible] 2018-19 Date :- 01 02 2019

To,
The Chief Executive Officer,
Malkapur Nagar Palika Malkapur,
Tal. Karad, Dist. Satara.

Subject- Permission for visit on your ETP Unit regarding...

Respected sir/madam ,

Our the students of Yashodha College of engineering satara seeking in Third Year Civil engineering. As per Shivaji University curriculum We need to visit on ETP - Sewerage treatment plant for academic purpose only.

In connection with this , we kindly request you to give us permission for visit on your renowned ETP plant. So student will get valuable information. They will visit along with subject teacher prof. Lembhe S.S. Number of students visiting are 45.

Kindly give permission as early as possible. Preferably give us one guide Mr.Tele sir. So it will be helpful for our students.

Thanking you with regards.

Yours faithfully,

DR. N. G. Narve
Director
(YSPM's YTC , satara.)

Forwarded through :

HOD
(Civil engg department)
YTC , satara.

Dt- 11/02/19 finalized for visit ETP unit Malkapur

यशोदा शिक्षण प्रसारक मंडळ, सातारा.

-: वाहन मागणी अर्ज :-

प्रति,
मा. ट्रान्सपोर्ट अधिकारी,
डायएसपीएम, सातारा.

मी, श्री. डॉ. सुनील शिवाजीराव कुमार साहेबराव भरत पद असिस्टंट प्रोफेसर स्थायी पदावरी
शाखा यशोदा कॉलेज ऑफ इंजि. NH4 - लाडे, सातारा येथे कार्यरत असून ~~मला~~ / आम्हाला खालीलप्रमाणे प्रवास करण्यासाठी महाविद्यालयाच्या वाहनाची आवश्यकता आहे, त्यास मंजूरी मिळावी.

प्रवास मार्ग	प्रवासाचे कारण
• कॉलेज ते कराड मलकापूर • मलकापूर ते कराड - सातारा भरत कॉलेज (यशोदा कॅम्पस)	शिवाजी विद्यापीठाच्या आदेशानुसार T E (ins) विद्यार्थी ४५ मलकापूर कराड येथे मार्गनिःसारण प्रकल्प भेट देणेसाठी
दिनांक	**वेळ**
11/02/2019	सकाळी 10.00 वा ते 03.00 वाजे पर्यंत

दिनांक 08/02/2019

कळावे,
आपला विश्वासू,
सही प्रा० डॉ० एस एस ... प्रा० कु० कुमार एस बी

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वाहन प्रकार : बस MH11 T9756 E वाहन नं.
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सदर मागणी अर्ज प्रवासाच्या ७ दिवस आधी मंजूर करून घेण्यात यावा

One Page Report of Visit at MIDC Water Treatment Plant,Satara.

Visit Place- **MIDC Water Treatment Plant, Satara**

Visit Date-: 13th August 2018

Purpose of Visit-:

1. To understand various sources of water with respect to quality and quantity of water.
2. To describe and design the various water treatment units.
3. To learn the special water treatments and sequencing of treatment for various qualities of surface & ground water.
4. To design the various components related to transmission and distribution of water.
5. To understand various water supply appurtenances.
6. To outline the principles of green building.

In this visit students studiedp the various components of water treatment plant like

1. Intake chamber
2. Sedimentation tank
3. Coagulation process
4. Filtration process
5. Disinfection
6. Transmission process of water

Outcome of Visit-:

1. Describe the various sources of water with respect to quality and quantity of water.
2. Describe and design the various water treatment units.
3. Illustrate the special water treatments and sequencing of treatment for various qualities of surface & ground water.
4. Design the various components related to transmission and distribution of water.
5. Summarize the different water supply appurtenances.
6. Explain the principles of green building.

Yashoda Shikshan Prasarak Mandal's
YASHODA TECHNICAL CAMPUS, SATARA
FACULTY OF ENGINEERING
NH-4, Wadhe Phata, Satara., Tele Fax- 02162-271238/39/40
Website- www.yes.edu.in, Email-assodirector_engg@yes.edu.in
Approved by AICTE, DTE, Mumbai, Affiliated to SUK / MSBTE, Mumbai

Prof. Dashrath Sagare
President

Dr. N. G. Narve
Principal

Ref. No. – YSPM/YTC/ADMIN/247/2018-19 **Date:** 6th **August 2018**

To,

The Assistant Engineer,
Water treatment plant,
MIDC,Satara.

Dear Sir,

We are very much thankful to you for accepting our request for a visit for a subject 'Environmental Engineering I', also giving us such a valuable knowledge about this subject on 13th August 2018. On behalf of management of the YTC, we would like to place on record our sincere thanks for the same.

We look forward to your suggestion, continued guidance and support in the future to enable us to constantly improve the standards of our institute.

Thanking You.

YASHODA TECHNICAL CAMPUS 6757 SATARA

Principal
Director
YSPM's Yashoda Technical Campus
Satara

13/8/18

DEPUTY ENGINEER
MIDC SUB-DIVISION SATARA

YSPM's Yashoda Technical Campus * Satara * Faculty of Engg.(Civil)

YSPM's
YASHODA TECHNICAL CAMPUS, SATARA
Faculty of Engineering
Department of civil Engineering
Address: S. No. 242/1, V. N. Road, Wadhe, NH-4, Satara. Phone – 02162-271238/39/40/41/42.
E-Mail ID: admin@yspmsatara.co.in E-Mail ID : http://www.yes.edu.in/

Date: 31/07/2018

To,
The Assistant Engineer,
Water treatment plant,
M.I.D.C Satara

Sub-: Regarding permission to visit Water Treatment Plant at M.I.D.C Satara.

Respected sir/ Madam,

As per the Shivaji University, Kolhapur curriculum Third year Civil Engineering students are required to visit water treatment plant in order to get realization of the theoretical concept. Accordingly, a group of about 40 students would like to visit the plant. They will be accompanied by our faculty Ms. Mane A.A.

The exact date and time of visit will be defined by our faculty Member after having due consultation with yourself.

Therefore, it is requested to grant permission for this visit and co-operate in this matter

Thanking you.

Yours faithfully
Ms. Mane.A.A

Resp sir
Kindly sanction
31.7.18

YSPM's Yashoda Technical Campus
Faculty of Engg.(Civil)

Yashoda Shikshan Prasarak Mandal's
YASHODA TECHNICAL CAMPUS, SATARA

Report of Industrial Visit

Name of the Industry and address of plant visited		Name of faculty organizing visit	
Water treatment plant MIDC Satara.		Ms. Mane A. A.	
		Class:- T. E. 1	Date:- 13th Aug 2018
Officer contacted for permission of the visit		Subject:- Environmental engg I.	
Name	Mr. Prabhawalkar.	Duration of visit	3 Hours
		Students present	31
Designation	Assistant engineer	Name of faculty accompanying	1.
Mobile No			2.
Email-ID			3.
			4.

Purpose of visit:-
to learn the special water treatments & sequencing of treatment for various qualities of surface & ground water.

Observation made during the visit:-
Practicley students understand the water treatment process.

Outcome of the visit:-
Students can get knowledge of various water treatment units & their working principle.

Feedback from Industry(Please tick √)

1) Student interest & Curiosity :- Excellent / Good / Satisfactory/ Poor

2) Students Behavior:- Excellent / Good / Satisfactory/ Poor

Name of official with Designation	B. R. Prabhavalkar Assistant Engineer (Env)	Signature:-	
Signature of organizing teacher	Date:- 13/08/18.	Signature of HOD	DEPUTY ENGINEER SUB-DIVISION SATARA

Documents to be attached: (Hardcopy)	Record:-
Correspondance with Industry Attendance sheet of students Photograph showing students at Industry Entrance	Original copy :- In department file Photocopy :- IQAC cell

Yashoda Shikshan Prasarak Mandal's
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Prof. Dashrath Sagare
President

Dr. N. G. Narve
Principal

Ref. No.– YSPM/YTC/ADMIN/247/2018-19 Date: 6th August 2018

To,

The Assistant Engineer,
Water treatment plant,
MIDC,Satara.

Dear Sir,

We are very much thankful to you for accepting our request for a visit for a subject 'Environmental Engineering I', also giving us such a valuable knowledge about this subject on 13th August 2018. On behalf of management of the YTC, we would like to place on record our sincere thanks for the same.

We look forward to your suggestion, continued guidance and support in the future to enable us to constantly improve the standards of our institute.

Thanking You.

YASHODA TECHNICAL CAMPUS 6757 SATARA

Principal
Director
YSPM's Yashoda Technical Campus
Satara

13/8/18

DEPUTY ENGINEER
MIDC SUB-DIVISION SATARA

Yashoda Shikshan Prasarak Mandal's
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NH-4, Wadhe Phata, Satara., Tele Fax- 02162-271238/39/40
Website- www.yes.edu.in, Email-assodirector.engg@yes.edu.in
[illegible]

Prof. Dasharath Sagare
President

Dr. N. G. Narve
Principal

Ref. No. – YSPM/YTC/ ADMIN/223/2018-19 Date: - 03[rd] August 2018

To
The Assistant Engineer
Water treatment plant
MIDC Satara.

Sub: Permission regarding Industrial Visit to Water Treatment Plant at MIDC Satara.

Respected Sir/ Madam,

With due regards, we would like to seek your kind permission for arranging an industrial visit to your Water Treatment Plant at MIDC Satara site for our students of TE Civil Engineering.

Students are going to be accompanied by two faculty members from our Department of Civil Engineering, managing students and taking care for them in every regard is our responsibility.

CLASS	TE CIVIL
No. of Students	40
Name of Faculty	Ms. A. A. Mane

Looking forward for your approval.

Received
3/8/2018

13/8/2018

Regards
Mr. [illegible]
Civil Department
YTC Satara

Director

Site Visit Report

Date-13/08/2018

Place- M.I.D.C.SATARA

Name-Water Treatment Plant M.I.D.C. Satara

Name Of Owner Of plant-M.I.D.C satara

Daily Treatment and Supply -6-7 MLD per day

Source Of water- Source of water is Krishna river satara by pump 2.5 km of source pipe distance and 200 HP pump are pumping the water 400 m3/hr discharge of water flow.

Capacity of Plant -25 MLD water treats the plant

List of various units-

1]Pintake chamber

2]coagulation tank

3]mixing channel

4]sedimentation tank

5]clarifier channel

6]filtration-rapid sand filter

7]chlorination tank

8]inspection chamber

9]storage tank

1]Intake chamber-Intake structures are used for collecting water from the surface sources such as river, lake, and reservoir and conveying it further to the water treatment plant. These structures are masonry or concrete structures and provides relatively clean water, free from pollution, sand and objectionable floating material.

2]Coagulatuion tank-Coagulation is also important in several water treatment operations. A common example is chemical phosphorus removal and another, in overloaded watertreatment plants, is the practice of chemically enhancing primary treatment to reduce suspended solids and organic loads from primary clarifiers.

3]Mixing channel-Coagulant is properly mixed in mixing channel.

4]Sedimentation tank- particles are settle down at the bottom of tank due to sp.gravity.

5]Clarrifier channel- In this clarifier water is retained for sufficient period to permit the floc settle at the bottom of tank.clarifier is design same as that of plain sedimentation tank with lower detention time.

6]Filtration –Rapid sand filter- The filtration process remove bacteria, colour, odour,taste,iron, manganese which makes the water is sprinking.

Rapid sand filter- Small particles are not removal in sedimentation tank these water gets filter through the filter and the filter water is taken to disinfection treatment .In rapid sand filter having seven type,layer of sand and gravels.

7].Chlorination tank-**Water chlorination** is the process of adding chlorine or hypochlorite to water. This method is used to kill certain bacteria and other microbes in tap water as chlorine is highly toxic. In particular, chlorination is used to prevent the spread of waterborne diseases such as cholera, dysentery, and typhoid.

8].Inspection chamber –The water tasting and checking in inspection chamber ,manhole are provided in the chamber.

9].Storage tank –water storing in the tank upto 7 MLD .This water is useable for drinking purpose.after that water distribute in MIDC area.

Photos-

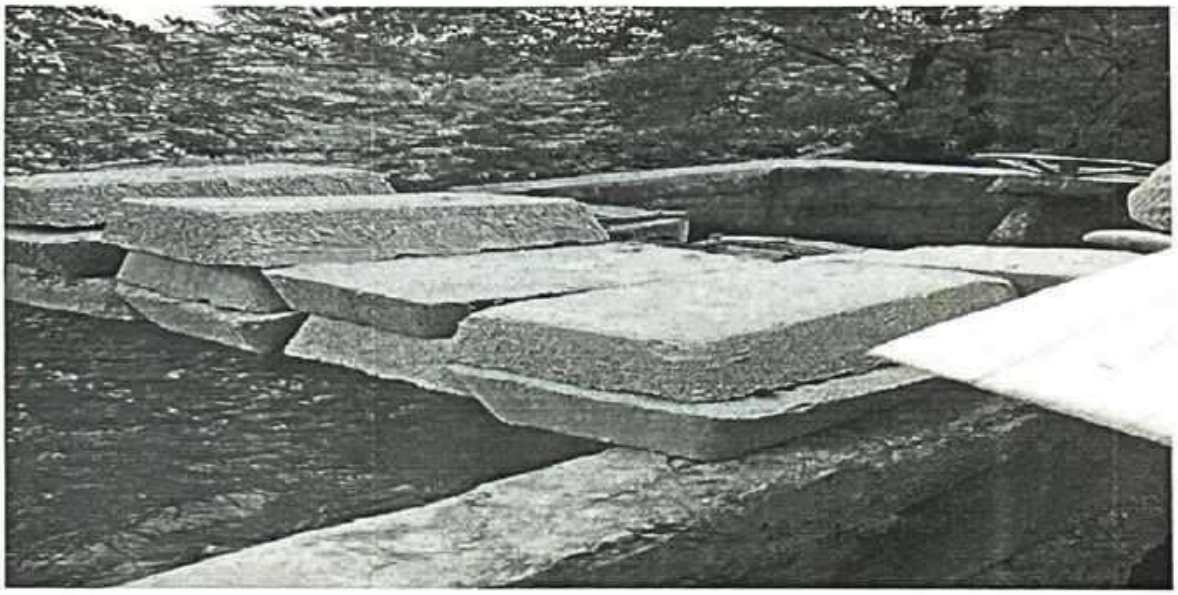

Fig01. Block of alum.

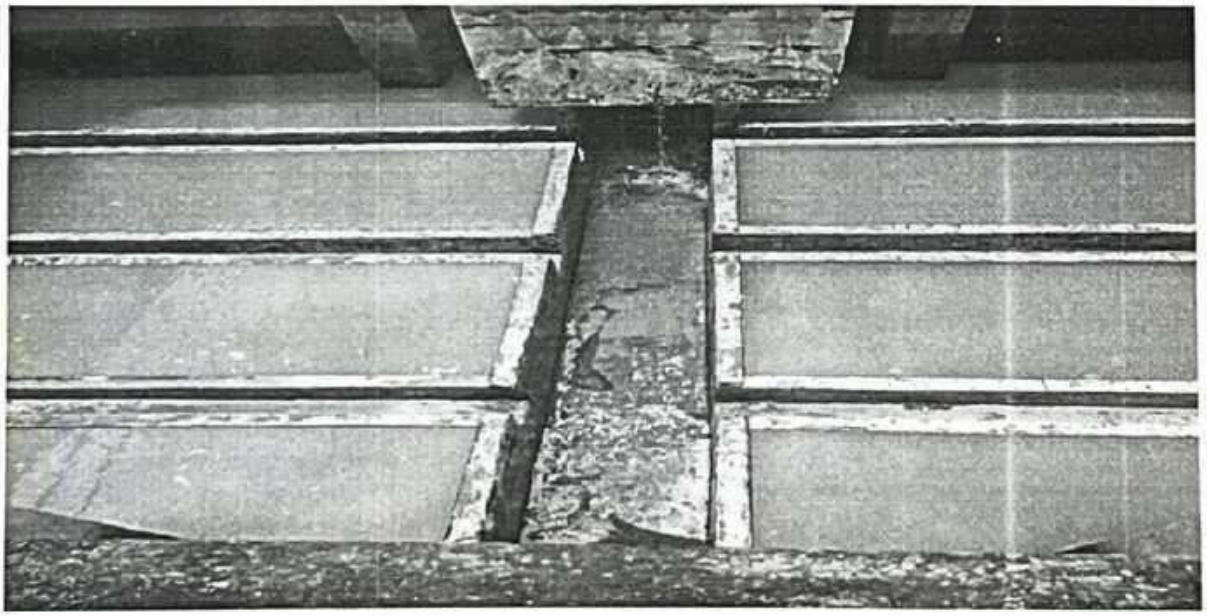

Fig 02; filter media

Fig 03; group photo

Student's Attendance Sheet

Class: T.E
Subject: Environmental Engg I

Date: 13/8/2018
Time: 11 am to 2 pm.

Roll No	Name of student	Sign
1	Komble Prajakti S.	Pskomble.
2	Kotte Kajal R.	Rkotte
3	Pawar Anjali N	Anale
4	Shubham Bhilare	Bhilare
5	Vinod bhosale	Vbhosale
6	Chavan Archana P.	Pchavan.
7	Chavan. Rohan. R	Rchavan
8		
9	Deshmukh Namrata P.	Pdeshmukh
10	Ghange Komal Vikas	Vghange
11		
12		
13	Roshan R. Kadam	Rkadam
14	Rajat S. kamble	Rajat
15	sohel N khan	Nskhan
16	Kudale Pratik Vijay	Pkudale
17	Yadav Prajakta. S	Syadav
18	Wagh Neha B.	NBwagh
19	Korde Supriya Surendra	Skorde
20	Magdum ammar M	Mmagdum
21	Mahangade Abhijit P.	Amahangade
22		
23	Patil Nikhil vilas.	N.V.Patil
24	Patil Rohit E.	Rpatil
25	Patil Yogesh k.	Ypatil
26	Pawar Akshay m	Mpawar
27	Pawar Dhanashri. A	Apawar
28		
29	Salunkhe Saurabh. m	Ssalunkhe
30	Shete pallavi. S	Pshete

Roll No	Name of student	Sign
31		
32	Supekar Akash R.	Asupekar
33	Sutar Gitanjali B.	Gsutar
34	Vidhate Shubham H.	Shvidhate
35	Yadav Rakesh S.	Ryadav.
36	Kitdaut Vaibhav S	Vkitdaut
37		
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39	Raut Ankita R.	Araut
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Department of Civil Engineering

Letter of Undertaking for Industrial Visit given by Students

Date: 12/8/12

To,
The Principal,
Faculty of Engineering,
Yashoda Technical Campus, Satara.

Sub: Undertaking for Industrial Visit.

Dear Sir,

We are the students of third year, Department of Civil engineering in YTC, Satara herewith voluntarily submitting the under taking.

We, the undersigned students are aware that, the college shall not be held responsible in the event of any misfortune or accidents and/or personal injuries during the visit.

Yours sincerely,

ROLL.NO.	NAME OF STUDENT	MOBILE NO.	SIGN
1	Kamble Pragati shashikant.	9689488836	Pskamble.
2	Kajal Rajendra Katte	7719004758	Rkatte
3	Pawar Anjali Namdev	8275196454	Anjali.
4	Bhilare Shubham Mohan	9561235773	BhareSM
5	Vinod Bhosale	7775944295	VBhosle
6	Archana popat chavan	7410741136	Achavan
7	Chavan. Rohan. Rahul.	7378740467	Rchavy
8			
9	Deshmukh Namrata Pravin	7058641257	Deshmukh
10	Komal vikas Gharge	7700007919	Kgharge
11			
12			
13	Roshan R. Kadam	7083880143	RKadam

14	Rajat Suresh karobole	8530402517	Rajat.
15	Sohel N khan.	9145569997	S.Nkhan
16	Kudale Pratik Vijay	9545177296	Pkudale
17	Yadav prajakta S.	7262053314	S.Yadav
18	Wagh Neha B	7262053314	NBwagh
19	Korde Supriya Surendra	7218875268	Skorde.
20	Magdum amrapur Mahavir	9561454743	Magdum
21	Mahangade Abhijit Prata	7410182989	Amhp.
22			
23	Patil Nikhil vilas	9922813828	N.V.Patil.
24	Patil Rohit E	8975897172	Rotil
25	Patil yogesh k.	7776965102	YKP
26	Pawar Akshay m	8888063182	Amfawar
27	Pawar Dhanashri. A	9130484706	Apawar.
28			
29	Salunkhe Saurabh M	7710039712	Sam
30	Shete pallavi Shriyal	9763990193	PShete
31			
32	Supekar Akash Rajendra	9922016670	ASR
33	Sutar gitanjali Baburao	7517992907	Sutar
34	Vidhate Shubham H.	9637630168	Shvidhate
35	Yadav Rakesh sopan	7709077590	Ryadav.
36	Kitkelat vaibhav G	9860203276	Gkitkelat
37			
38			
39	RautAnkita Rajendra	9665376485	Araut

Yashoda Shikshan Prasarak Mandal's
YASHODA TECHNICAL CAMPUS, SATARA
NAAC- B +
NH-4, Wadhe Phata, Satara. Tele Fax- 02162-271238/39/40
Website- www.yes.edu.in,Email – meanod_ytc@yes.edu.in
Approved by AICTE, DTE, Mumbai, Affiliated to DBATU Lonere, SUK/ MSBTE.

Prof. Dasharath Sagare
Founder, President

Dr.V K Redasani
Director

7.1.5 Green campus initiatives include

4. Ban on use of Plastic:

Sustaining cleanliness is the essential part of healthy living because it is hygiene and he lpsus to develop our personality by keeping us clean externally and internally. So PIT decided to go plastic free in the campus. There are no paper cups, plastic plates and spoons instead of that we are using steel glasses, plates and spoons inside the campus. We are using only steel. We had "Plastic freezone"to create awareness among the community as whole to stop the pollution and leave behind a green and pollution free place for our future generations.

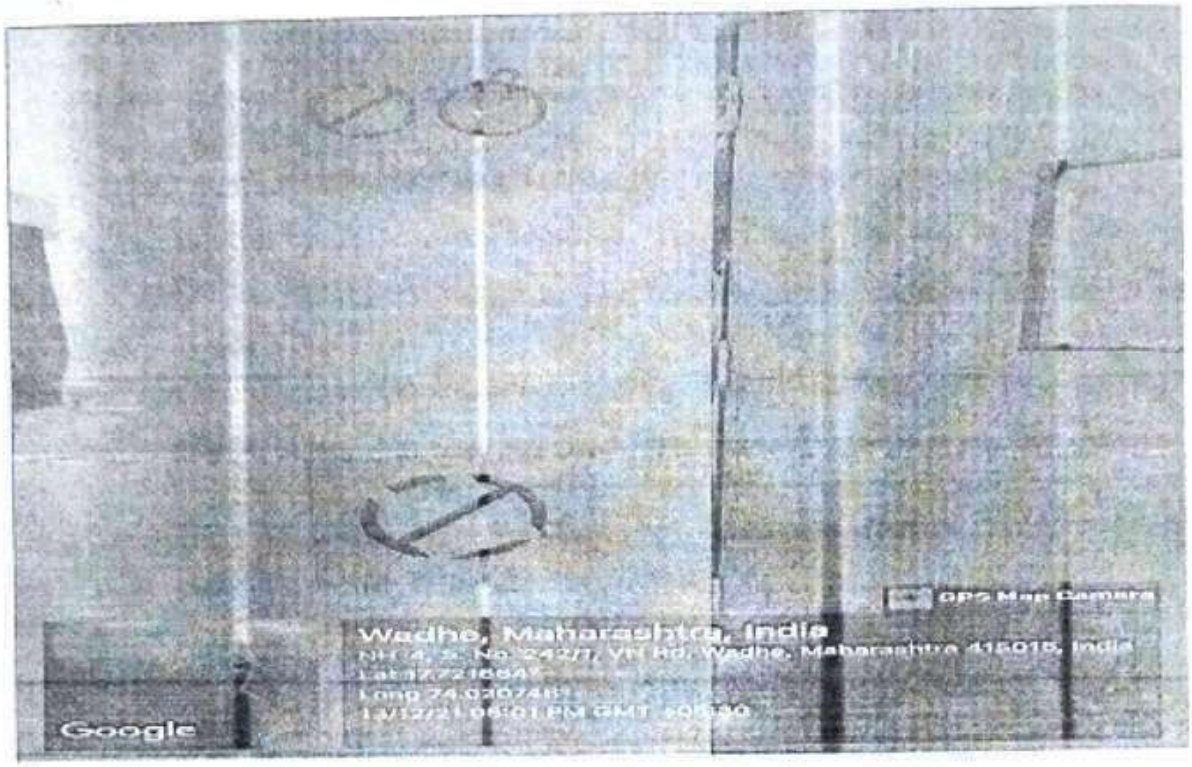
Here are some of the advantages of plastic bags:

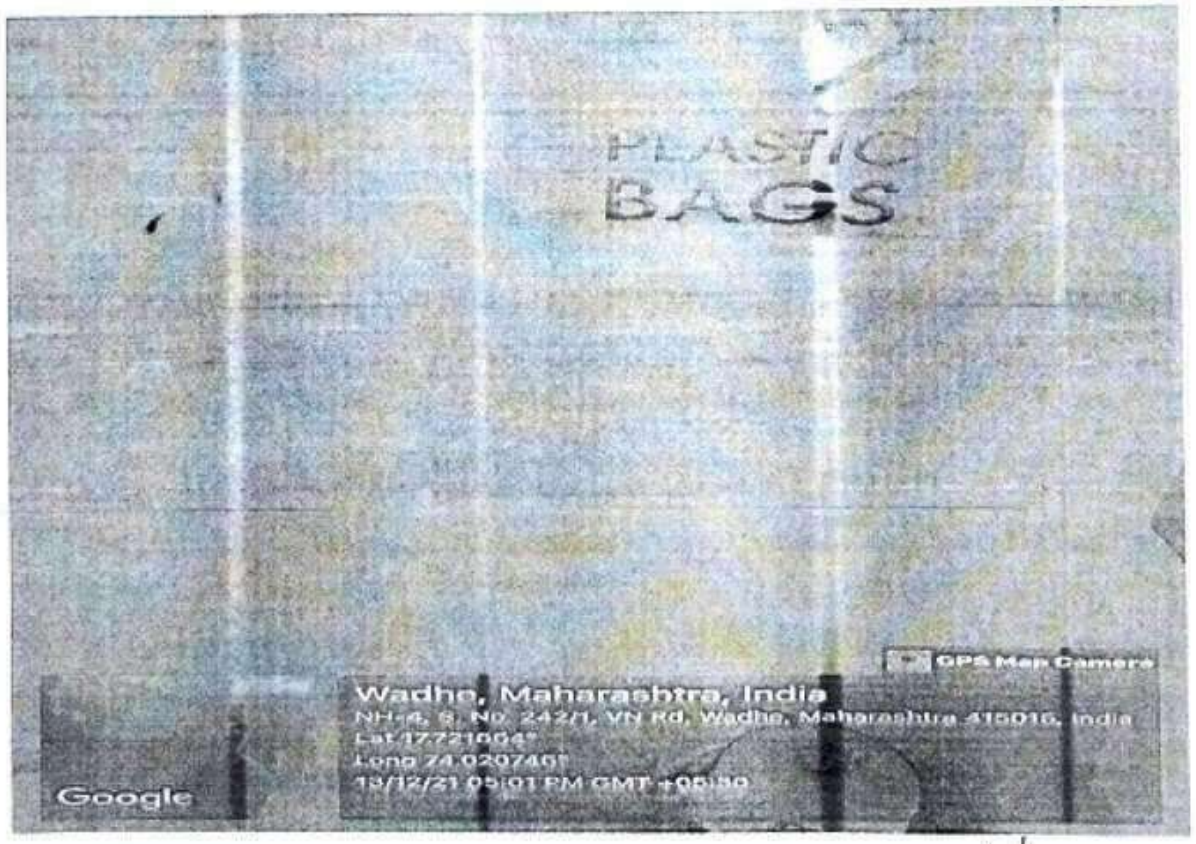
- They are lightweight and easy to transport. This makes them ideal for carrying groceries or other items that need to be moved around.
- They are water-resistant. This means that they can be used to protect items from rain or snow.
- They are durable. Plastic bags can withstand a lot of wear and tear, making them a good choice for carrying heavy items.
- They are inexpensive. Plastic bags are relatively cheap to produce, making them a cost-effective option for businesses and consumers.
- They are recyclable. Most plastic bags can be recycled, which helps to reduce waste.

YASHODA TECHNICAL CAMPUS 6757 SATARA

Overall, **plastic bags** have good advantages. It is important to weigh these factors when deciding whether or not to use plastic bags. If you do use plastic bags, it is important to recycle them properly to help reduce their environmental impact.

Photos:





H. O. D.
YSPM's YASHODA TECHNICAL CAMPUS, SATARA
FACULTY OF MCA