ARAVALI INSTITUTE OF TECHNICAL STUDIES

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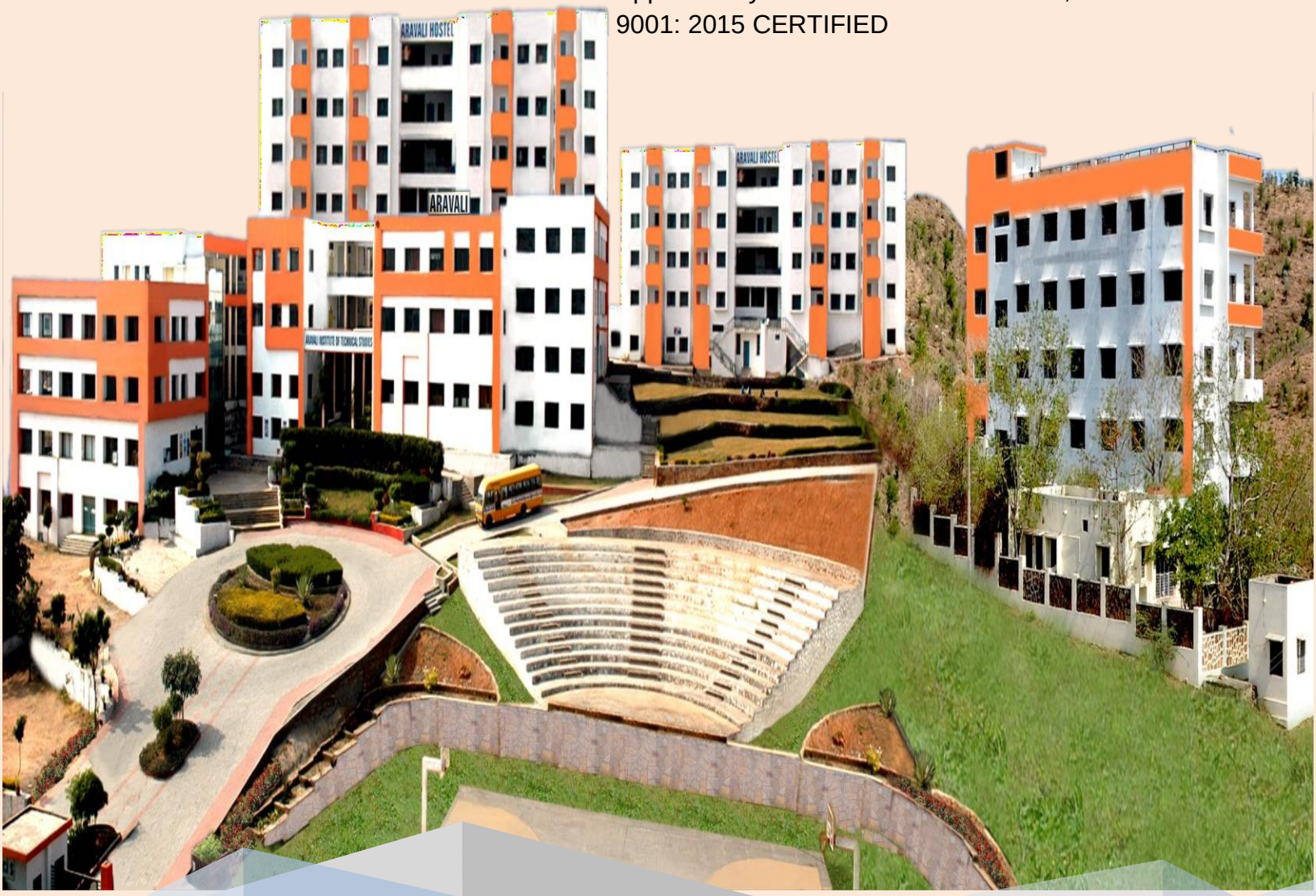


Mechanical Engineering Department

News Letter

Mechanical Mirror

Published on August, 2020

VOLUME I, ISSUE II

Vision

Towards a Global Knowledge Hub, striving continuously in pursuit of excellence in Mechanical Engineering Education, Entrepreneurship and Innovation

Mission

- To impart total quality education through effective hi-tech teaching-learning techniques and department-industries collaboration.
- To mold the young dynamic potential minds to emerge as full-fledged future professionals so as to achieve top ten ranking status in the national level.
- To achieve international standards to fulfill the Government's "Make In India" industrial policy through innovation and research.

Program Specific Outcomes (PSO's)

PSO1: Ability to challenge the start of an accessible business and address the complex technical issues identified in designing, heat, and creating related businesses with the target device.

PSO2: Ability to directly analyze and recover actual situations related to design using calculation methods and tools. You can work freely under research and mechanical conditions.

PSO3: The ability to intelligently incorporate information received both verbal and compound.

Message from Director

Dr. Hemant Dhabhai

Director, Aravali Institute of Technical Studies

Mechanical engineering is one of the oldest and broadest engineering disciplines, and plays a significant role in enhancing safety, economic vitality, enjoyment and overall quality of life throughout the world. A prerequisite for development is growth and that is directly related to production or output of a country. If production is done via a sustainable path, it can maintain the sustainability of development.

I am glad to know that the Department of Mechanical Engineering of AITS is bringing out a monthly Newsletter. The college is proud of the achievements of the students and staff of the department and bringing out this Newsletter. I wish all success for the Newsletter and hope they carry forward the vigor and dedication for bringing out the future volumes of Newsletter.

EDITOR DESK

Gourav Purohit

ADSW, Aravali Institute of Technical Studies

It gives me an immense pleasure to introduce Mechanical Mirror Newsletter of Mechanical Engineering. This newsletter will help our department stay connected to a given community. As we offer students a regular dose of department-related news and information, we are also giving them another way to contact department and to keep in touch with it. Even as students or faculty graduate and alumni, they will likely stay in contact with the newsletter, thereby preserving the relationship they have with the department.

Message from HOD

The Mechanical Engineering Department was established in the year 1990 with an intake capacity of 60 students per year in Diploma and B.tech Program. A separate building having Top floor is available for department. In addition to this a separate building for workshop is also available opposite to the mechanical building. The faculty members are highly qualified and experienced.

During the course of the study, the students are imparted theoretical and practical knowledge in the various aspects of Mechanical Engineering at diploma level. In addition they are also exposed to industrial environment through industrial visits and industrial trainings/internship. Our institute has Various Clubs Activities in which the students are trained for social service and community development activities .Sports facilities are also available in our institute through which the students are trained in physical education and activities.

It is heartening to note the all the students passing out of our department are successfully place in various nearby industries as well as pursuing higher technical studies bringing a good name to the institution in the region.

Mr. Gourav Purohit

Professor and Head Department of Mechanical Engineering

SEMINAR: HOW TO GET REGISTER FOR A GOOD JOB

Date: 17 th January, 2020

Keynote Speaker: Mr. Himanshu Moad

REPUBLIC DAY CELEBRATION

Date: 26 th January, 2020
Flag Hosting By: Mr. Dhanpat Singh Employement Officer

BASANTPANCHMI

Date: 26 th January, 2020

INTERNATIONAL SEMINAR: PROSPECTS OF E-COMMERCE IN INTERNATIONAL SCENARIO

Date: 31 th January , 2020

Keynote Speaker: Mr. Aarush Sharma, Sr. Oracle Consultant (Louis Vuitton, Paris, France), Special Guest Dr. Ajay Kr. Sharma (Dean, CTAE)

Customer Relation Management in Corporate Sector

Date: 5 th Feburary, 2020

Keynote Speaker: Mrs. Kratika Kataria Marketing Consultant Zen, 3 Paris France

Recent Advancement in Machine and Space Technology

Date: 21 st Feburary, 2020

Keynote Speaker: Mr. R.M. Shah, Joint Secretary, SSME, ISRO, Ahmadabad

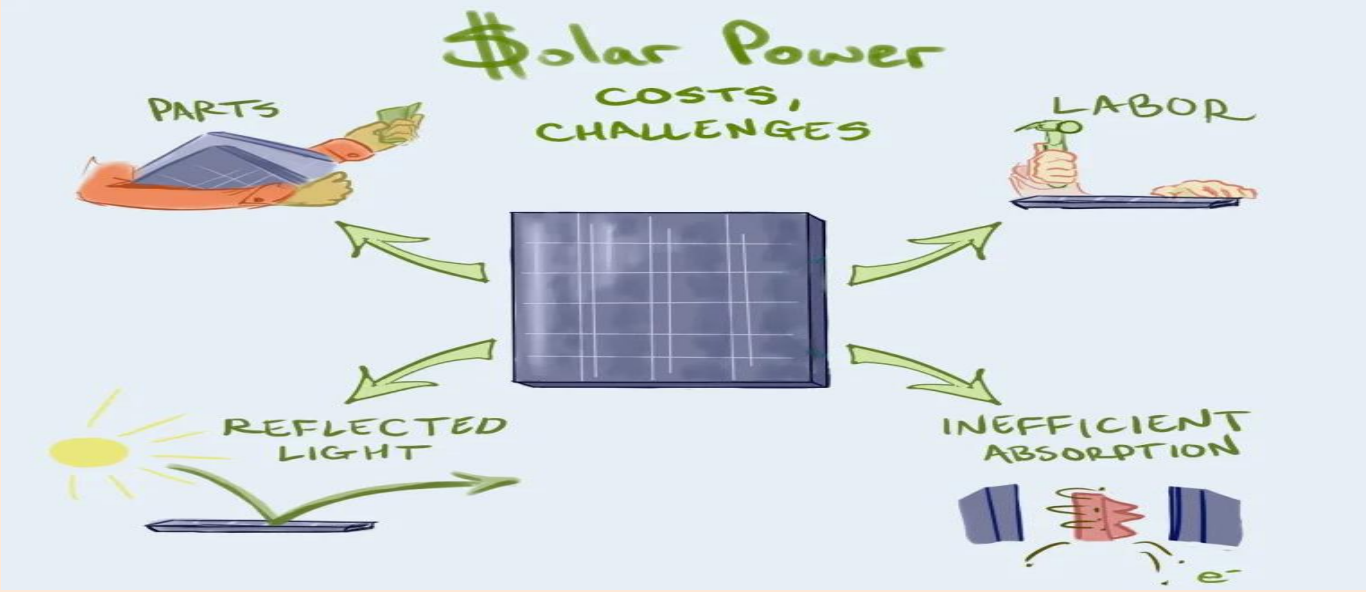
Student Corner

Solar Cell

New technological advances over the last twenty years have driven this increased reliance on solar by decreasing costs, and new technological developments promise to augment this solar usage by further decreasing costs and increasing solar panel efficiency.

Solar Cells: Costs, Challenges, and Design

Over the past 20 years, the costs associated with solar cells, the structures capable of converting light energy into electricity, have been steadily decreasing. The National Renewable Energy Laboratory, a US government lab estimate that hard costs, the costs of the physical solar cell hardware, and soft costs, which include labor or costs to obtain required government permits, are about equal. Soft costs have decreased because there are more potential consumers and more installation experts for new solar cells, so companies can produce solar cells in bulk and install them easily. Hard costs are less than half of what they were in the year 2000, mostly due to decreasing material costs and an increased ability of cells to capture light. Engineering more cost-effective and efficient solar cells has required careful consideration of the physics involved in solar capture in addition to innovative design.



Because solar cells are used to convert light into electricity, they need to be composed of some material that's good at capturing energy from light. This material can be sandwiched between two metal plates which carry the electricity captured from light energy to where it is needed, like the lights of a home or machines of a factory . Choosing the right material to capture light involves measuring the difference between two energy levels called the valence band and the conduction band. The lower-energy valence band is filled with many small negatively charged particles called electrons, but the higher-energy conduction band is mostly empty. When electrons are hit

with particles of light, called photons, they can absorb enough energy to jump from the low-energy conduction band into the high-energy valence band. Once in the valence band, the extra energy in the electron can be harvested as electricity. It's as if the electrons are sitting at the bottom of a hill (the conduction band) and being hit by a photon that gives them the energy to leap to the top (the valance band).

The amount of energy needed for electrons to jump into the valence band depends on the type of material. Essentially, the size of the metaphorical hill varies based on the properties of a given material. The size of this energy gap matters because it impacts how efficiently solar cells convert light into electricity. Specifically, if photons hit the electrons with less energy than the electron needs to jump from the valence band to the conduction band, none of the light's energy is captured. Alternatively, If the light has more energy than is needed to overcome that gap, then the electron captures the precise energy it needs and wastes the remainder. Both of these scenarios lead to inefficiencies in solar harvesting, making the choice of solar cell material an important one.

Historically, silicon has been the most popular material for solar cells. One reason for this popularity lies in the size of the gap between silicon's conduction and valence bands, as the energy of most light particles is very close to the energy needed by silicon's electrons to jump the energy gap. Theoretically, about 32% of light energy could be converted into electric energy with a silicon solar cell. This may not seem like a lot, but it is significantly more efficient than most other materials. Additionally, silicon is also inexpensive. It is one of the most abundant elements on earth, and the cost of refining it has decreased dramatically since 1980. The solar cell and electronics industries have driven the decrease in purification cost as they have learned better bulk purification techniques to drive the demand of solar cells and consumer electronics. In addition to decreasing material costs, clever engineering tricks are pushing the efficiency of silicon solar cells closer to their theoretical maximum. In order for photons to be converted into energy, they must first collide with an electron. One trick to increase the likelihood of a photon/electron collision involves patterning the silicon in solar cells in microscopic pyramid shapes. When light is absorbed into a pyramid, it travels further, increasing the probability that the light will collide with the electrons in the silicon before escaping the cell.

In a similar tactic, chemists and material scientists have designed anti-reflective coatings to put on the front of solar cells to prevent useful light from being reflected back into space without ever hitting an electron in the solar cell. Likewise, putting a reflector on the back of the solar cell also allows more light to be harvested. The light that reaches the solar cell and makes it all the way through to the back without hitting an electron gets bounced to the front of the cell, giving the cell another chance of collecting the light.

Currently, the cost of silicon-based solar cells continues to decrease, and, despite predictions to the contrary, the cost of silicon itself continues to decrease. Silicon solar cells are likely to remain popular for the next few years. Alternatives to silicon solar cells have been developed but aren't far enough along to be commercially viable.

Mr. Himanshu Kumawat
Mechanical Student

Vision:

Tomorrow will take care of itself if one does an excellent job today. To nurture and develop talent, blended with values and technology to strengthen the technical manpower of the nation.

Mission:

- Impart quality education along with industrial exposure.
- To provide industry interface for faculty and students to work on projects with end goal of real time knowledge.
- Enhancing the quality of life through sustainable development.
- To continuous development of infrastructure and enhance state-of-the-art equipment to provide our students a technology up-to-date and intellectually inspiring environment of learning, research, creativity, innovation and professional activity and provide ethical and moral values.

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