



**Gayatri Vidya Parishad College of Engineering for Women**

Madhurawada, Visakhapatnam, 530048  
(Affiliated to JNTUK, Approved by AICTE, New Delhi)

**DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING**

# *Vidyut - 2k17*

*...the electrical magazine*



## **Issue 1**

*If Your Hate Could Be Turned Into Electricity,  
It Will Light Up The Whole World*

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## PRESIDENT'S MESSAGE

It is a matter of great pride that Gayatri Vidya parishad College of Engineering for Women has made consistent progress, year on year, in academic and co-curricular activities

Dear students, "You are the nation-builders. You are the movers of technology. You are the agents of change." It is our fervent hope that the years that you spend in this college would enable you to equip with holistic skills for your bright future. The knowledge that you will gain, the fine qualities that you will imbibe and the technical skills that you will learn to apply will be your major contribution to your parents, to society, and to the nation.



## DIRECTOR'S MESSAGE

I am very much delighted and pleased to know that the College is bringing out a Magazine with good and useful information on Engineering and Technology and also the available infrastructure and facilities provided for the benefit of students and Faculty.

The efforts by the faculty and students to bring out this magazine with a beautiful getup needs a good word of appreciation.

I wish this would continue in future too which certainly upholds the academic environment and decorum of this campus.

Let me thank all the senior teachers and the other faculty who had shared their experiences by their rich and highly informative contributions to the Magazine.



## PRINCIPAL'S MESSAGE

As I embark upon my journey as the Principal for Gayatri Vidya Parishad College of Engineering for Women, I am jubilant to meet through this page which is a driving force for the students and faculty at GVPCEW to be proactive towards learning. As we try to prepare the students always to "Think and Review" so as to discover the cause and effect of every event, would surely reveal the hidden talents of the academic fraternity. It gives me immense pleasure to encapsulate yet another occasion of success. I congratulate everyone who endeavours towards our cherished motto of empowering the students for all round development through technical education. Thorough acquisition of knowledge fringed with skills required and character building is our promise by providing necessary resources and resourceful intelligentsia ensuring expected settlement.



## VICE-PRINCIPAL'S MESSAGE

Vision is strong; the dream comes true only through grit, determination and devotion. I bless all the young aspirants to strive hard, use synergy to reach paramounting position in your desired path. Realize the immanent strenght; never leave any stone unturned in the path of learning and gaining. I am a staunch believer that the actions speak more than the words and that everybody must keep his promises to discharge duties as a responsible person of the society.



## HOD'S MESSAGE

The G.V.P. College of Engineering for Women is facilitating such a nice platform to the students of all branches to prove themselves and enrich their knowledge. Hope that each participant will enjoy the academic flavours of all programs and gain high confidence levels. I wish the program to be a grand success.



## EDITORIAL

Educational institutions are the " temples of learning ".in parlance of great thinkers. It is institutions which create individual values as contributing citizens of India.

Profession of Engineering is old as human life is yet to be synchronized globally thereby giving deserved respectability to the engineer. It is in this direction much work need to be done through continuous productive interactions between institutions, industrial associations and global regulatory bodies.

It is interesting to learn about the institution's services rendered in shaping lives of youngsters who arrive as raw individuals at the portals of this institution. Deep rooted conviction of management combined with dedicated faculty has made us stand out as an institution of reckoning for the past 10 years. Our best wishes to every member of the team for making expressions become the much awaited magazine of Indian fraternity.

We are happy to bring out the this issue of " VIDYUT" for the year 2017. The magazine.. In this issue the faculty article is on 'Optimization in Engineering Design using Golden Section Search (GSS) ' by Mrs. V. Sree Vidhya who has explained the concept of MPPT of Solar Module using GSS method under partial shading conditions to the readers. There are two student articles one on "Single-Stage Single-Phase Reconfigurable Inverter Topology" and the other on "BLOOM ENERGY" . The article have introduced the concepts in the beautiful manner. This is followed by the regular sections of Technology Review, Know a Scientist, Short Story and Puzzles, Arts. This issue also contains the contributions and achievements of the students and faculty of the department during the year. We are thankful to the entire department for their continuous support in bringing this issue successful.

## VISION

To develop into a centre of learning that empowers students with contemporary knowledge in Electrical and Electronics Engineering.

## MISSION

- Impart skills both in traditional and modern areas of Electrical & Electronics Engineering
- Provide exposure to latest developments in the field through Seminars, Industrial visits, Workshops and Paper presentations.
- Prepare the young minds to apply professional engineering practices by considering environmental and societal needs.

## PROGRAM EDUCATIONAL OBJECTIVES

**After successful completion of the program, the graduates will be able to:**

- **PEO-1:** Possess a strong educational foundation in mathematics, science, electrical engineering and soft skills in the diversified sectors of the industry.
- **PEO-2:** Exhibit critical thinking, problem-solving skills, and design systems in professional engineering practice.
- **PEO-3:** Establish leading and supportive positions in society by adopting lifelong learning skills with a commitment to their ethical and social responsibilities.

## PROGRAM SPECIFIC OUTCOMES

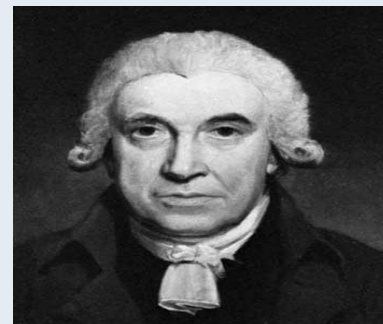
**Engineering Graduates will be able to:**

PSO-1: Design and analyze systems that efficiently generate, transmit, distribute and utilize electrical power.

PSO-2: Demonstrate proficiency in the use of hardware and software tools for solving the complex engineering problems in renewable energy and other emerging areas

## KNOW A SCIENTIST

**James Watt**, (born January 19, 1736, Greenock, Renfrewshire, Scotland—died August 25, 1819, Heathfield Hall, near Birmingham, Warwick, England), Scottish instrument maker and inventor whose steam engine contributed substantially to the Industrial Revolution. He was elected fellow of the Royal Society of London in 1785.



### **Education And Training:**

Watt's father, the treasurer and magistrate of Greenock, ran a successful ship- and house-building business. A delicate child, Watt was taught for a time at home by his mother; later, in grammar school, he learned Latin, Greek, and mathematics. The source for an important part of his education was his father's workshops, where, with his own tools, bench, and forge, he made models (e.g., of cranes and barrel organs) and grew familiar with ships' instruments.

Deciding at age 17 to be a mathematical-instrument maker, Watt first went to Glasgow, where one of his mother's relatives taught at the university, and then, in 1755, to London, where he found a master to train him. Although his health broke down within a year, he had learned enough in that time "to work as well as most journeymen." Returning to Glasgow, he opened a shop in 1757 at the university and made mathematical instruments (e.g., quadrants, compasses, scales). He met many scientists and became a friend of British chemist and physicist Joseph Black, who developed the concept of latent heat. In 1764 he married his cousin Margaret Miller, who, before she died nine years later, bore him six children.

### The Watt Engine:

While repairing a model Newcomen steam engine in 1764, Watt was impressed by its waste of steam. In May 1765, after wrestling with the problem of improving it, he suddenly came upon a solution—the separate condenser, his first and greatest invention. Watt had realized that the loss of latent heat (the heat involved in changing the state of a substance—e.g., solid or liquid) was the worst defect of the Newcomen engine and that therefore condensation must be effected in a chamber distinct from the cylinder but connected to it. Shortly afterward he met British physician, chemist, and inventor John Roebuck, the founder of the Carron Works, who urged him to make an engine. He entered into partnership with him in 1768, after having made a small test engine with the help of loans from Joseph Black. The following year Watt took out the famous patent for "A New Invented Method of Lessening the Consumption of Steam and Fuel in Fire Engines."

Meanwhile, Watt in 1766 became a land surveyor; for the next eight years he was continuously busy marking out routes for canals in Scotland, work that prevented his making further progress with the steam engine. After Roebuck went bankrupt in 1772, English manufacturer and engineer Matthew



Boulton, the manufacturer of the Soho Works in Birmingham, took over a share in Watt's patent. Bored with surveying and with Scotland, Watt immigrated to Birmingham in 1774.

After Watt's patent was extended by an act of Parliament, he and Boulton in 1775 began a partnership that lasted 25 years. Boulton's financial support made possible rapid progress with the engine. In 1776 two engines were installed—one for pumping water in a Staffordshire colliery, the other for blowing air into the furnaces of British industrialist John Wilkinson, the famous ironmaster. That year Watt married again; his second wife, Ann Mc Gregor, bore him two more children.

During the next five years, until 1781, Watt spent long periods in Cornwall, where he installed and supervised numerous pumping engines for the copper and tin mines, the managers of which wanted to reduce fuel costs. Watt, who was no businessman, was obliged to endure keen bargaining in order to obtain adequate royalties on the new engines. By 1780 he was doing well financially, though Boulton still had problems raising capital. In the following year Boulton, foreseeing a new market in the corn, malt, and cotton mills, urged Watt to invent a rotary motion for the steam engine, to replace the reciprocating action of the original. He did that in 1781 with his so-called sun-and-planet gear, by means of which a shaft produced two revolutions for each cycle of the engine. In 1782, at the height of his inventive powers, he patented the double-acting engine, in which the piston pushed as well as pulled. The engine required a new method of rigidly connecting the piston to the beam. He solved that problem in 1784 with his invention of the parallel motion—an arrangement of connected rods that guided the piston rod in a perpendicular motion—which he described as “one of the most ingenious, simple pieces of mechanism I have contrived.” Four years later his application of the centrifugal governor for automatic control of the speed of the engine, at Boulton's suggestion, and in 1790 his invention of a pressure gauge, virtually completed the Watt engine.

## **PATENTS:**

- Patent 913: A method of lessening the consumption of steam in steam engines – the separate condenser. The specification was accepted on 5 January 1769; enrolled on 29 April 1769, and extended to June 1800 by an Act of Parliament in 1775.
- Patent 1,244: A new method of copying letters. The specification was accepted on 14 February 1780 and enrolled on 31 May 1780.
- Patent 1,306: New methods to produce a continued rotation motion – sun and planet. The specification was accepted on 25 October 1781 and enrolled on 23 February 1782.
- Patent 1,321: New improvements upon steam engines – expansive and double acting. The specification was accepted on 14 March 1782 and enrolled on 4 July 1782.
- Patent 1,432: New improvements upon steam engines – three bar motion and steam carriage. The specification was accepted on 28 April 1782 and enrolled on 25 August 1782.
- Patent 1,485: Newly improved methods of constructing furnaces. The specification was accepted on 14 June 1785 and enrolled on 9 July 1782.

# Optimization in Engineering Design Using Golden Section Search Method

Mrs. V.Sree Vidhya,  
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## INTRODUCTION

Engineering is a profession where principles of nature are applied to build useful objects. A mechanical engineer designs a new engine, or a car suspension or a robot. A civil engineer designs a bridge or a building. A chemical engineer designs a distillation tower or a chemical process. An electrical engineer designs a computer or an integrated circuit. For many reasons, not the least of which is the competitive marketplace, an engineer might not only be interested in a design which works at some sort of nominal level, but is the best design in some way.

The process of determining the best design is called optimization. Thus we may wish to design the smallest heat exchanger that accomplishes the desired heat transfer, or we may wish to design the lowest-cost bridge for the site, or we may wish to maximize the load a robot can lift. Often engineering optimization is done implicitly. Using a combination of judgment, experience, modeling, opinions of others, etc. the engineer makes design decisions which, he or she hopes, lead to an optimal design. Some engineers are very good at

this. However, if there are many variables to be adjusted with several conflicting objectives and/or constraints, this type of experience-based optimization can fall short of identifying the optimum design. The interactions are too complex and the variables too numerous to intuitively determine the optimum design.

## WHY OPTIMIZATION IS NECESSARY?

Optimization is a word that tends to get misunderstood as each person seems to have their own interpretation of what optimization means. Engineers and technicians instinctively think of optimization as “trial and error.” Others believe that the optimization process is exhaustively listing the design possibilities and picking the best one. Then there are those who perceive that optimization is simply making qualitative suggestions that lead to a better product design.

## Optimization as a Quantitative and Systematic Methodology:

By this formal definition, optimization has three essential elements: variables, objectives, and constraints.

**Variables:** Variables are entities and parameters that a designer can change, such as material choice, shape of the product, geometric dimensions, operating parameters, settings, and so on.

**Objectives:** Objectives are the goals that a designer wants a product or process to achieve, such as the lowest cost, highest performance, least mass, highest efficiency, or minimum deviation from ideal values.

**Constraints:**

Constraints represent the safety regulations, standards and codes, and technical specifications that a product or process must satisfy. For example, a car designer must consider numerous design standards and codes so that the car is safe, comfortable, and environmentally friendly. Simultaneously, a car must perform as well as its competitors and preferably with lower costs to produce. All these can be defined as constraints.

It goes without saying that adjusting variables will impact objectives and/or constraints; otherwise, such variables should not be included in the optimization study.

**Statement of an optimization problem**

- An optimization problem can be stated as follows:

To find  $X = \begin{bmatrix} x_1 \\ x_2 \\ \vdots \\ x_n \end{bmatrix}$  which minimizes  $f(X)$

Subject to the constraints

$$g_i(X) \leq 0, i = 1, 2, \dots, m$$

$$l_j(X) = 0, j = 1, 2, \dots, p$$

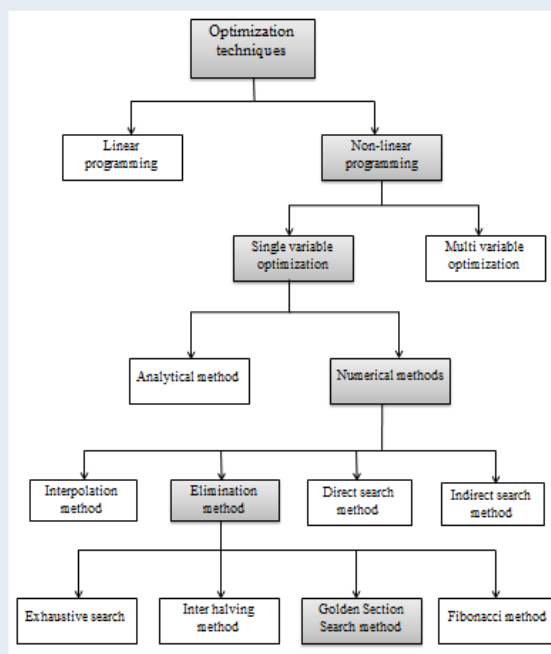
where  $X$  is an  $n$ -dimensional vector called the design vector,  $f(X)$  is called the objective function, and  $g_i(X)$  and  $l_j(X)$  are known as inequality and equality constraints, respectively.

**Optimization Techniques:**

An optimization technique is used to optimize the given objective function. The procedure consists of finding the design variable values that results in the best objective function value, while satisfying all the equality, inequality and other constrains.

**Advantages:**

1. It yields the best solution within the domain of study.
2. Requires fewer experiments to achieve an optimum formulation.
3. It predicts the direction of improvement.



**Golden Section Search (GSS) Method:**

- Golden Section is a technique to find out the extremum (maximum or minimum) of a strictly unimodal function by successively narrowing the range of values.
- This method maintains the function values for triples of points whose distances form a Golden ratio , So it's known as **Golden Section Method** or **Golden Ratio Method** .
- It is developed by an American statistician **Jack Carl Kiefer** in 1956 . He also developed Fibonacci Search Method .

### Derivation of the Method of Golden Section Search:

Consider a continuous and unimodal function 'f' over a given interval [a,b]. A reduction factor is required for the search to get

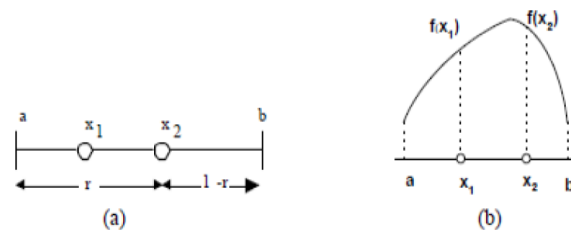


Figure6: (a) Division of interval (b): Interval as marking on the characteristics

minimum iterations. [2], [3], [4]

### Terminology:

**Unimodal Function:** a function  $f(x)$  is a unimodal function if for some value  $m$ , it is monotonically increasing for  $x \leq m$  and monotonically decreasing for  $x \geq m$ . In that case, the maximum value of  $f(x)$  is  $f(m)$  and there are no other local maxima.

**Interval of Uncertainty:** Consider the line search problem to minimize  $\theta(\lambda)$  subject to  $a \leq \lambda \leq b$ . Since the exact location of the minimum of  $\theta$  over  $[a, b]$  is not known, this interval is called the interval of uncertainty.

**Golden Ratio:** Two quantities are said to be in the golden ratio , if their ratio is the same as the rate of their sum to the larger of the two quantities. e.g

$$a + b/a = a/b \stackrel{\text{def}}{=} \phi$$

where Greek letter phi( $\phi$ ) represents Golden ratio . It value is

$$\phi = (1 + \sqrt{5})/2 = 1.6180339887.....$$

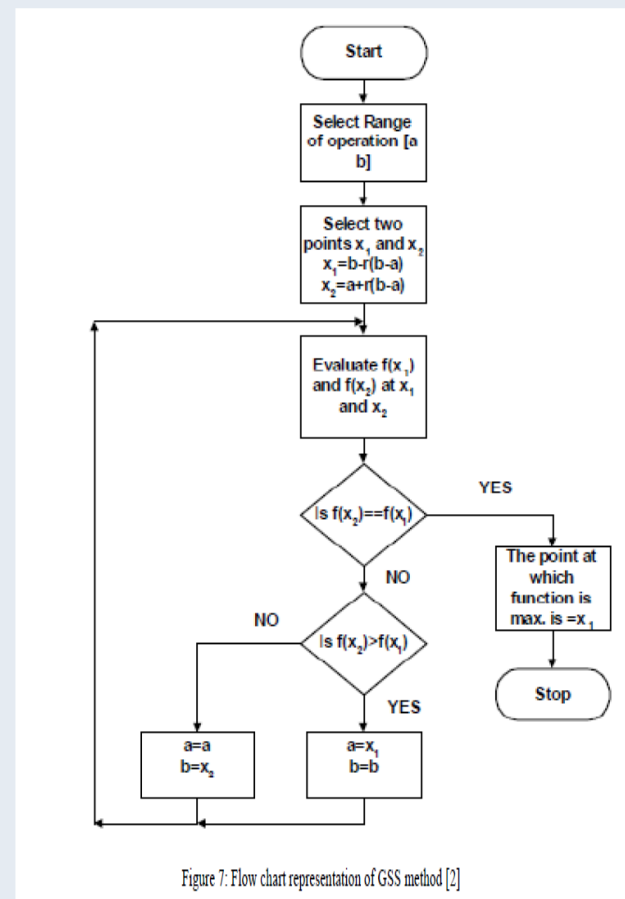


Figure 7: Flow chart representation of GSS method [2]

### MPPT Using GSS Method:

The main objective of the present work is to consider MPPT even during partial shading conditions such that the overall efficiency of the system is improved.

The photovoltaic (PV) module has been the interface of electrical energy generation from the solar irradiation. As the solar

radiation, ambient temperature and solar cell temperature are not constant throughout the day, the maximum power condition varies all the time due to which the efficiency of PV cell decreases. To increase the efficiency of PV cell maximum power point tracking is used with a non-linear optimization technique called Golden Section Search (GSS) is used to track maximum power.

The GSS method has the advantage of converging fast to extremum conditions even under partial shaded conditions. A tool has been developed using MATLAB modelling the PV module operation under partial shading conditions and the result obtained is validated with existing work in the literature.

## CONCLUSION:

The design of PV module with 54 cells connected in series to generate a power of 210W and 95 W under unshaded (1000W/m<sup>2</sup>) and partially shaded conditions respectively. Hence, GSS technique is used as the optimization method to track maximum power at unshaded and partially shaded conditions of the PV module which helps the system to converge in five iterations.

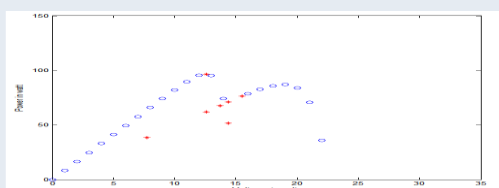


Figure shows P-V characteristics of a PV module under partial shaded

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[http://en.wikipedia.org/wiki/Jack\\_Kiefer\\_\(mathematician\)](http://en.wikipedia.org/wiki/Jack_Kiefer_(mathematician))

<http://en.wikipedia.org/wiki/Unimodality>  
Online Tool used for mathematical formulation

- <http://math.typeit.org/>

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Publisher : John Willey & Sons Inc.

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Publisher : Prentice – Hall of India Private Limited.

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1. “Using Golden Ratio Search to Improve Paired Construction of Quality Control Charts” by Xia Pan, , Jeffrey E. Jarrett at International Journal of Economics an Management Engineering (IJEME).
2. "Golden Section Search Optimization Technique For Maximum Power Point Tracking", Ajay Patel, Vikas Kumar, Yogendra Kumar /International Journal of Engineering Research and Applications (IJERA).
3. "Golden Section Search (GSS) Algorithm for Maximum Power Point Tracking in Photovoltaic System", Jaya Agrawal, MohanAware, Member IEEE ,Electrical Engineering Department, Visvesvaraya National Institute of Technology, Nagpur, India.

# BLOOM ENERGY

Ch. Venu- 14JG1A0204,  
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3<sup>rd</sup> B Tech.

## INTRODUCTION:

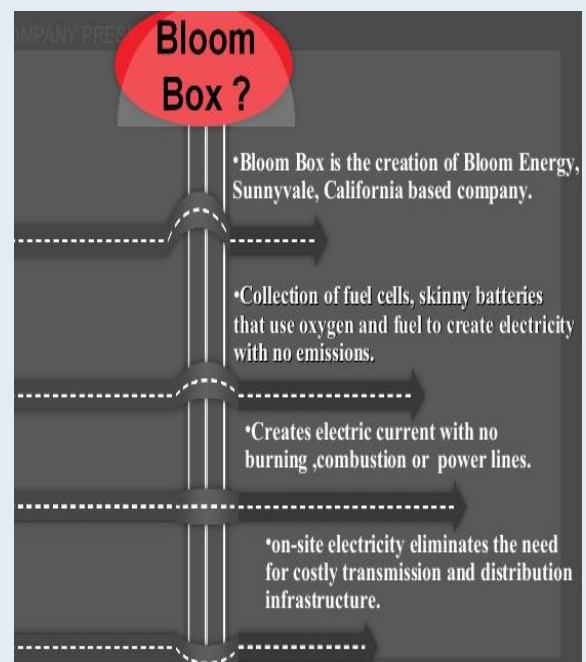
Firstly, the use of fossil fuel in electricity production produce harm full emission such as CO<sub>2</sub> and other green house gases in air. In 2009 over 75% of the electricity used in US came from non-renewable fossil fuels. In today's expanding global economy ,the needs for sustainable is energy more pressing than ever. The new sustainable energy should be looked at to this crisis as they can be used to eliminate these usage of fossil fuels or eventually reuse them completely.



Bloom Energy is a company that was founded in 2001 by K.R. Sridhar.

## Source Of Bloom Energy:

**Bloom energy server uses solid oxide fuel cells(SOFC) technology.** The main source of Bloom Energy is the Bloom box or the bloom server in which it contains a solid oxide fuel cell.



## Construction:

The Bloom Energy Server uses thin white ceramic plates (100 × 100 mm) that are made from beach sand. Each plate is coated with green nickel oxide-based ink on one side, forming the anode, and another black (probably Lanthanum strontium manganite) ink on the cathode



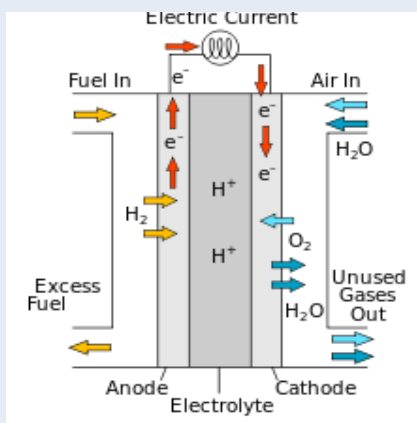
side.

For more power, the cells are sandwiched, along with metal interconnect plates called "stack". In an Energy Server, multiple stacks are aggregated together into a "power-module", and then multiple power modules, along with a common fuel input and electrical output are assembled as a complete system. Each Bloom Energy fuel cell is capable of producing about 25W enough to power a light bulb and each Energy Server consists of thousands of Blooms fuel cells.

**Working:**

In solid oxide fuel cell, the electrolyte is a solid ceramic material (sand). The anode and cathode are made from special inks that coat the electrolyte. Unlike other types of fuel cells, no precious metals, corrosive acids, or molten materials are required.

Next, an electrochemical reaction converts fuel and air into electricity without combustion. A solid oxide fuel cell is a high temperature fuel cell. At high temperature, warm air enters the cathode side of the fuel cell and steam mixes with fuel to produce reformed fuel which enters on the anode side.



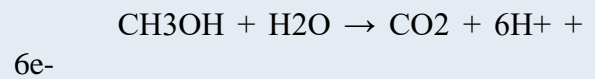
Next, the chemical reaction begins in the fuel cell. As the reformed fuel crosses the anode, it attracts oxygen ions from the cathode.

The oxygen ions combine with the reformed fuel to produce electricity, water, and small amounts of carbon dioxide.

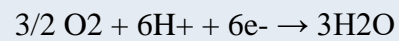
The water gets recycled to produce the steam needed to reform the fuel and also generates the heat required by the fuel cell.

**For methanol fuel cells below chemical reactions take place:**

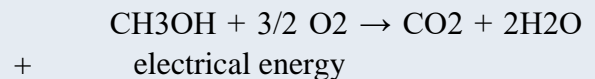
Anode Reaction:



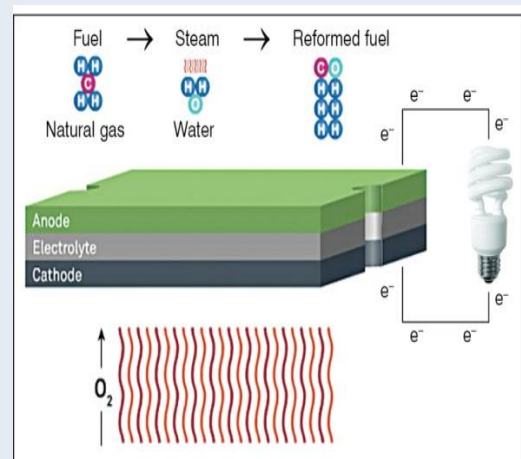
Cathode Reaction:



Overall Reaction:



For methane as fuel:



**ADVANTAGES:**

**Carbon Sequestration:** The electrochemical reaction occurring within

Bloom Energy systems generates electricity, heat, some H<sub>2</sub>O, and pure CO<sub>2</sub>.

Traditionally, the most costly aspect of carbon sequestration is separating the CO<sub>2</sub> from the other effluents. The pure CO<sub>2</sub> emission allows for easy and cost-effective carbon sequestration for the Bloom systems.

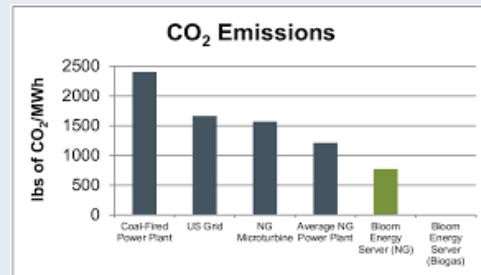
- **Reverse Backup:** Businesses often purchase generators, uninterruptible power supplies and other expensive backup applications that sit idle 99% of the time, while they purchase their electricity from the grid as their primary source. Increased asset utilization leads to dramatically improved ROI for Bloom Energy's customers.



- **Time to Power:** The ease of placing Bloom Energy Servers across a broad variety of geographies and customer segments allows systems to be installed quickly, on demand, without the added complexity of cumbersome combined heat and power applications or large space requirements of solar. Fast installation simply requires a concrete pad, a fuel source, and an internet connection.

- **DC Power:** Bloom systems natively produce DC power, which provides an elegant solution to efficiently power DC data centres and/or be the plug-and-play provider for DC charging stations for electric vehicles. □ **Hydrogen Production:** Bloom's technology, with its NASA roots,

can be used to generate electricity and hydrogen. Coupled with intermittent renewable resources like solar or wind, Bloom's future systems will produce and store hydrogen to enable a 24 hour renewable solution and provide a distributed hydrogen fuel-in infrastructure for hydrogen powered vehicles .



#### APPLICATIONS:

- Bloom Energy can be used where the onsite generation of electricity is used.
- It can be used as a plug and play type of electricity.
- It can be used for all purposes like domestic and industrial.

#### CONCLUSION:

- Bloom box is able to produce constant electricity twenty four for hours in a day.
- Sridhar has ambitious goals for his Bloom Box planning not only to place it in every American home in 10 years, but also in homes in Africa, India, and China.
- To determine the implication of the Bloom Energy server as a whole the individual aspects of the technical ,economical, and social implications together. Additionally it needs to be compared to other equivalent renewable technologies.

#### REFERENCES:

[www.bloomenergy.com](http://www.bloomenergy.com)

[www.google.com](http://www.google.com)



# LED vs CFL Bulbs

Shabosti Bose ,  
S. Yamini,  
2<sup>nd</sup> B Tech.

## INTRODUCTION

When it comes to decorating a new house, most of us think about adorning it with colourful bulbs and lights. In the process of beautifying our home, we generally forget about our environment and cost of electricity. Despite of the repeated TV commercials underlining the benefits of LED lights, most of us still opt for traditional decorative bulbs.

If you judge incandescent bulbs with LEDs on the basis of price, then traditional bulbs become a clear choice. But if you think of future savings and profits, nothing but LEDs are a right choice to make. Let us see why.

### Why are LED Lights Better?

LED lights are rapidly transforming lighting technology. LED bulbs are more durable, reduce environmental damage, slash costs and offer exceptional quality lighting as compared to traditional or incandescent bulbs. So it is best to replace those superannuated 60-watt incandescent bulbs in your house with the energy efficient alternative of LEDs.

Due to advancement in technology, LED bulbs began illuminating larger areas, which was previously restricted to laboratory and smaller electronic devices. There are various uses of LED lights which are beneficial for individuals, business owners and the environment. Listed below are a few advantages.

## ENERGY EFFICIENCY OF LED LIGHTS:

LED lights virtually produce no heat (limited to 80%) in the illuminating process, therefore they are relatively cool. Approximately 20% electric energy gets transformed to light energy in these bulbs.

While in traditional bulbs, about 80% electric energy is lost as heat energy resulting on only 20% efficiency, that is, conversion to light energy. This is exactly the reason why traditional bulbs blow out soon and LEDs have a better longevity.

- LED lights encourage lower energy usage and guarantee higher safety due to production of less heat.
- LED lights can reduce your electricity bills and carbon emissions.
- LED lighting solutions are quite affordable due to lower maintenance cost and longer lifespan.
- LED bulbs are both energy efficient and environmental friendly.

It is due to its lower energy consumption, LEDs are becoming more popular in remote areas. Despite these advantages, many people still buy traditional bulbs. The major reason why people are still choosing incandescent bulbs over LEDs is the price. Although LEDs are an expensive investment, the cost is quickly reimbursed over time in lower electricity bills. It is worth your investment for long term benefits.

## OTHER BENEFITS:

Energy efficiency and cost savings are not the only benefits of LED lights, there are many others.

- LEDs also have a longer lifespan of about 60,000 hours as compared to incandescent bulbs that last only up to 1,500 hours.
- Environment-friendly and multiple usage are some of the other notable merits of LED lights.

If every household across the globe replaces just one traditional bulb with an energy efficient LEDs, the world would save twice on their annual electricity cost and energy. Replacing your incandescent bulbs with LED lights may make a lot of monetary gains in the long run.

In short -CFL is the curly light bulb and LED is the long light bulb.

## CFL vs LED BULBS:

### WORKING:

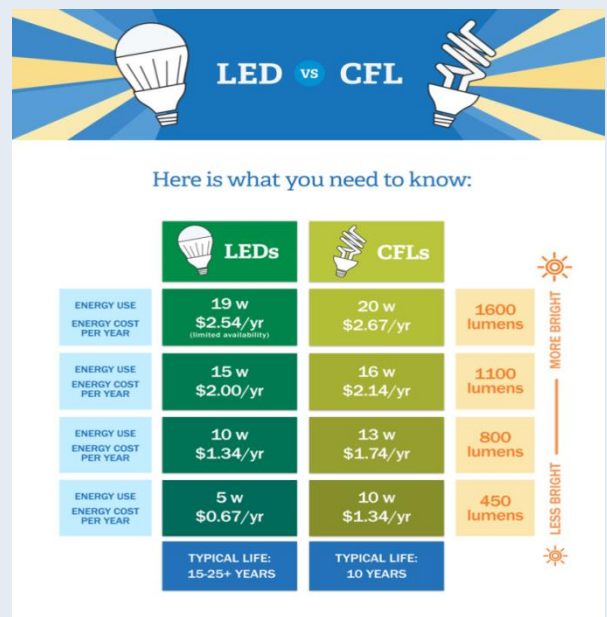
LED light bulbs produce light when an electrical current passes through them. In CFL bulbs an electric current flows between electrodes at each end of a gas-filled tube. The reaction creates ultraviolet light and heat, which is then changed into light when it hits a phosphor coating on the bulb's interior.

The differences to keep in mind when examining CFL vs LED bulbs:

- LEDs emit very little heat. In contrast, incandescent bulbs release 90% of their energy as heat, CFLs release about 80% of their energy as heat, according to Energy.gov.
- Another LED light benefit is that LEDs, because they emit light in a specific direction, do not need

diffusers or reflectors that trap lights. This helps increase LED efficiency for uses such as downlights (recessed downlights are common in residential kitchens, hallways and bathrooms) or task lighting.

- The Department of Energy estimates that there are at least 500 million downlights in U.S. homes, with more than 20 million sold each year. The DOE estimates that both CFL and LED lighting could decrease downlight wattage by at least 75%.
- The same LED string of holiday lights could still be in use 40 holiday seasons from now, according to Energy.gov.



This chart shows the difference in costs between CFL vs LED bulbs:

### REFERENCES:

- Derek Langley is a guest blogger interested in writing energy saving related article.
- [www.google.com](http://www.google.com)

# ENERGY EFFICIENT LIGHT SOURCES

V.Harika - 13JG1A0247,  
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4/4 B.Tech

## INTRODUCTION:

Light-Emitting Diodes (LED) are light sources utilizing diodes that emit light when connected in a circuit. The effect is a form of electro luminescence where LEDs release a large number of photons outward; the LED is housed in a plastic bulb, which concentrates the light source. The most important part of an LED is the semi-conductor chip located in the center of the light source.

## CONSTRUCTION AND WORKING:

It consists of p and n regions with a junction between them. The p region is dominated by positive electric charges and the n region is dominated by negative electric charges. The junction is a kind of wall between the two regions, blocking the passage of charge carriers between the two regions.

When sufficient voltage is applied to the semi-conductor chip, electrons can move easily across the junction where they are immediately attracted to the positive forces in the p region. When an electron moves sufficiently close to a positive charge in the p region, the two charges “re-combine”. When an electron combines with a positive ion, the electric potential energy gets converted to electromagnetic energy and this occurs in form of emission of a photon of light.

This photon has a frequency determined by the characteristics of the semiconductor material (usually a combination of the chemical elements gallium, arsenic, and phosphorus).

## LIGHTING APPLICATIONS USING LED:

The White LED is the most exciting new lighting technology since the introduction of the fluorescent lamps. High intensity LEDs are now popular because of their high low current requirements. High bright White LEDs are increasingly used in lighting application as a measure to conserve energy.

Applications of white LED includes back light illumination in mobile phones, LCD back lights, home and vehicle lighting, display boards etc. The LEDs are extremely small in size and consume little energy and efficiently converts electricity into light.

## Why is the White LED preferred?

A high watt LED usually produces around 75-100 lumens per watt at the expense of 350 milli ampere current. Energy loss through heat is practically nil in LEDs and they have very long life of thousands of hours. LEDs are eco friendly devices since they contain no lead or mercury. Unlike fluorescent lamps, LEDs do not emit UV rays.

A1- watt White LED gives around 100 lm luminous flux which is sufficient to light a confined area. The amount of light emitted by a light source is measured in terms of lumen. For instance, a 60 Watt bulb emits 730 lumen

and that by a 50 Watt halogen lamp is 900 lumen. Each LED chip has an area of only one square millimeter, which makes for very concentrated overall luminosity

The forward voltage drop of the 1 watt white LED is 3.3 volts and consumes 350 milli amperes current. Thus Ordinary white LED requires 3 volts and around 40 mA current to give maximum brightness.

High power White LEDs can be driven at high current of hundreds of milli ampere to an Ampere to produce high intensity light. Some makes can produce over a thousand lumens. The HPLEDs must be mounted on a heat sink to allow for heat dissipation otherwise the device will damage easily.

**Applications involving LED as a source of light:**

- LED based Emergency lamp
- Automatic Lamp using 1 W LED
- Portable Emergency Lamp cum Mobile charger

**The difference between lumens and watts:** Nowadays, the consumers need to understand while analyzing CFL vs LED bulbs is the difference between lumens and watts. Consumers are used to buying light bulbs based on watts, or how much energy they consume. It didn't matter how much light (lumens) they provided. Now, as a way to differentiate LED vs CFL bulbs, manufacturers are classifying the new energy-efficient bulbs by their lumens. You are buying your bulb based on the amount of light you want rather than the energy used by the bulb.

Admittedly, it can be confusing. Here's the basic point to keep in mind: More lumens equals more brightness. But exactly how many lumens is equivalent to what was once, say, a 60-watt bulb? Here's a breakdown to give you the basic new LED vs CFL light bulb math:

- To replace a 100-watt incandescent bulb, choose a bulb with about 1600 lumens.
- To replace a 75W bulb, choose a bulb with about 1100 lumens.
- To replace a 60W bulb, choose a bulb with about 800 lumens.
- To replace a 40W bulb, choose a bulb with about 450 lumens.



**Replacement Exit Signs with LED Signs:**

Of the three different styles of exit signs, incandescent signs are the least expensive, but are inefficient and use energy releasing heat instead of light. Fluorescent signs are also inexpensive and have an expected life of about 10,000 hours. LED exit signs are the most expensive, but are also the most efficient exit signs available.

The table represents an easy comparison of the three models:.

Parameter	Incandescent	Fluorescent	LED
Input Power (watts)	40	11	2
Yearly energy (kWh)	350	96	18
Lamp life (years)	0.25-0.5	1-2	10+
Estimated energy cost/year (\$0.06/kWh)	\$21.00	\$5.75	\$1.10

**REFERENCES:**

- www.energystar.gov/index
- http://eartheasy.com/live\_energyeff\_lighting.html

## DEPARTMENT ACTIVITIES

### Department Activities Organised For The Year 2017

S. No.	Activity type	Name of the Topic/subject	Date	Resource Person/ Judge	Student Participation
1	Industrial visit	POWERGRID , HVDC Substation, Ukkunagaram, Visakhapatnam	02-02-17	—	III-EEE
2	One day Workshop (TECHNOTSAV-2K17)	Integration of renewable source of energy to grid Workshop	16-03-17	N. V. Rajesh Kumar M, Senior Engineer-Solar PV Engineering, BHEL – Electronics Division, Bangalore	II/III/IV EEE (Participants)
3	TESLA INAUGURAL - Guest Lecture	Power System Protection	15-9-17	Mrs G.Vijaya Lakshmi Electrical Inspector, Directorate of Safety, Visakhapatnam	II, III& IV EEE
4	Power point Presentation	Recent Trends in Electrical Engineering	27-12-17	Dr K. Narasimha Rao HOD EEE, GVP College of Engineering (A), Visakhapatnam.	II, III& IV EEE



**Industrial Visit to POWERFRID, 400KV HVDC Substation**



**Guest lecture on " Integration Of Renewable Source Of Energy To Grid" in the one day Workshop during TECHNOTSAV-2K17**



**Guest Lecture by Mrs G.Vijaya lakshmi on account of Tesla Inaugural Program**



**Hybrid Power Plant Visit : Resource person demonstration to students**

## TOPPERS OF THE YEAR

Year	Roll No	Name Of The Student	Position
IV	14JG5A0210	P.Rajya Lakshmi Prasanna	First
III	14JG1A0245	Teegala Usharani	First
II	15JG1A0239	Siripuram Yamini	First
I	16JG1A0213	Kodiganti Sai Mani Manjula	First

### **Publication for the Year 2017:**

Name of the students.	Title of the paper	NAME OF THE JOURNAL	YEAR & MONTH	DOI
Ms.K.Poojitha & Ms.N.V. Prasanna	Maximum Power Point Tracking of Photovoltaic Modules using Golden Section Search Method.	International journal of engineering & technology (IJET)	JULY 2017	10.21817/ijet/2017/v9i3/170903S025

# Maximum Power Point Tracking Of Photovoltaic Module Using Golden Section Search Method

N. V. Prasanna<sup>3</sup> K. Poojitha \*

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**ABSTRACT**— The photovoltaic (PV) module has been the interface of electrical energy generation from the solar irradiation. The solar radiation, ambient temperature and solar cell temperature are not constant throughout the day. So, the maximum power condition varies all the time due to which the efficiency of PV cell decreases. To increase the efficiency of PV cell maximum power point tracking is used. Maximum Power Point Tracking (MPPT) is an algorithm that includes charge controller that is used for extracting maximum power available power from PV module under certain conditions. In addition to the above conditions, the irradiance on PV module is non-uniform due to shading of trees, clouds etc., called partial shading. Using conventional MPPT technique such as Perturb and Observe, Incremental conductance, Hill climbing it is not possible to track maximum power condition in partial shading condition. The main objective of the present work is to consider MPPT even during partial shading conditions such that the overall efficiency of the system is improved.

In this paper, a non-linear optimization technique called Golden Section Search (GSS) is used to track maximum power. The GSS method has the advantage of converging fast to extremum conditions even under partial shaded conditions.

A tool has been developed using MATLAB modelling the PV module operation under partial shading conditions and the result obtained is validated with existing work in the literature.

**Keywords:** Golden Section Search, Maximum Power Point Tracking, Partial shading

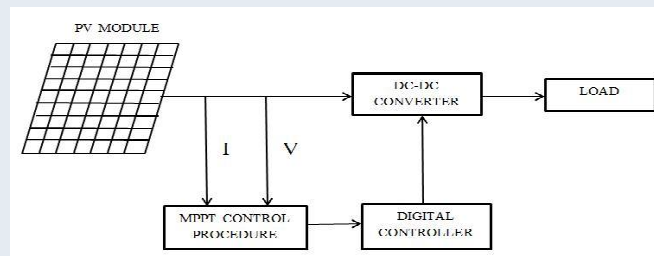


Figure1. Block diagram of PV system.



## STUDENT ACTIVITIES

### INTERNATIONAL YOGA DAY CELEBRATIONS

The practice of Yoga is something that has the power to heal entire body without any medication. Yoga day is celebrated on 21<sup>st</sup> of June every year which came into being in the year 2015 with the efforts made by the Prime Minister Narendra Modi. So GVPCEW also came forward and took initiative to celebrate international yoga.

### TECHNOTSAV-2K17

#### Technical Seminar :



Our Department has organized a one day workshop by Mr. Rajesh Kumar Mamidi, SE ( RES), BHEL Bangalore on 16th March, 2017 for the students during Technostav- 2017 and with the active participation made by our students , the event was a grand success.



**Gayatri Vidya Parishad**  
**College of Engineering for Women**  
(Approved by AICTE, New Delhi, Affiliated to JNT University, Kakinada)  
 Madhurawada, Visakhapatnam - 530048

**INVITATION**

The Management, Principal, Staff members and Students cordially solicit your gracious presence at

**The Valedictory Function of**  
**TECHNOTSAV - 2K17**  
 at 04:00 PM. on Friday, 17th March, 2017

**Sri A. S. N. PRASAD**  
 President, Gayatri Vidya Parishad  
 has kindly consented to preside over the function

*Chief Guest*  
**Mr. A. V. Balaji Kumar**  
 Engineering Manager, Chegg Inc. Visakhapatnam

*Guest of Honour*  
**Mr. Raghuvver Pulaparthi**  
 Sr. Director, OpenLogix Corporation  
 Detroit, Michigan, USA

*Venue*  
 Gayatri Vidya Parishad College of Engineering for Women  
 Madhurawada, Visakhapatnam

**Rangoli competition:**



**On the eve of Sankranthi, 15th January- the institution conducts rangoli competition every year before pongal holidays**

## List of Co-curricular Activities Participated by EEE Students

Sl .No	Name Of Student	Title Of Paper	Seminar / Conference	Organization / Date	Prize
1	G.Pavani	Ocean Energy Conversion Systems	Techwiki-2k17	Gvpce(A), 05-08-17	Participation
2	B.Sindhu Bhargavi	Ocean Energy Conversion Systems	Techwiki-2k17	Gvpce(A), 05-08-17	Participation
3	K.Girija Rani	Energy Management System	Techwiki-2k17	Gvpce(A), 05-08-17	Participation
4	I.Rushinja	Energy Management System-	Techwiki-2k17	Gvpce(A), 05-08-17	Participation
5	Shrabosthi Bose	IoT Based Smart Irrigation System	Techwiki-2k17	Gvpce(A), 05-08-17	Participation
6	Sh.Firdaus	Iot Based Smart Irrigation System	Techwiki-2k17	Gvpce(A), 05-08-17	Participation
7	Chi Vastsalya	Hybrid Electric Vehicles	Techwiki-2k17	Gvpce(A), 05-08-17	Participation
8	K. Supriya	Hybrid Electric Vehicles	Techwiki-2k17	Gvpce(A), 05-08-17	Participation
9	L. Niharika	Hybrid Electric Vehicles	Techwiki-2k17	Gvpce(A), 05-08-17	Participation
10	J Sravani	Green Building Technologies	Techwiki-2k17	Gvpce(A), 05-08-17	Participation
11	K L Prasanna	Green Building Technologies	Techwiki-2k17	Gvpce(A), 05-08-17	Participation

12	M.Sowmya	Applications of FACTS Controllers in Power Systems	Raghu's Chakravyuh 2017	Raghu's Educational Institute, held on 10 <sup>th</sup> 11 <sup>th</sup> and 12 <sup>th</sup> February, 2017	Participation
13	Shrabosti Bose	Review on applications of LIM	Encurso 2017	JNTU Kakinada Mar 4 <sup>th</sup> & 5 <sup>th</sup> 2017.	Participation
14	Siripuram Yamini	Review on applications of LIM	Encurso 2017	JNTU Kakinada Mar 4 <sup>th</sup> & 5 <sup>th</sup> 2017.	Participation
15	K. Girija rani		Technotsav-2K17	16 <sup>th</sup> & 17 <sup>th</sup> march,2017, GVPCEW	Participation
16	L Niharika	Solar Workshop	National level technical symposium	4 <sup>th</sup> & 5 <sup>th</sup> march 2017, GVPA	Participation
17	Ch Hari Priyanka	Integration of renewable source of energy to grid	Technotsav-2K17	16 <sup>th</sup> & 17 <sup>th</sup> march,2017, GVPCEW	Participation

### **List of Extra - Curricular Activities Participated by EEE Students**

Sl .No	Name Of Student	Tournament	Year And Date	Organization / Prize	Result
1	K.Usha Rani	Co-Co	Inter University Co-Co Selections, 22nd Sept,2017	Jntu, Kakinada	Participation
2	Revathi	Co-Co	Inter University Co-Co Selections, 22nd Sept,2017	Jntu, Kakinada	Participation
3	Akhila Sarvani	Co-Co	Inter University Co-Co Selections,22nd Sept,2017	Jntu, Kakinada	Participation
4	K.Usha Rani	Volleyball	Inter University Volley Ball, 8th Oct, 2017	Jntu, Narsaraopeta	Participation
5	G. Kalpana	Chess	Inter University Selections, 10th October, 2017	Gayatri Vidya Parishad College Of Engg. (A)	Participation

## STUDENT CORNER

### Puzzles:

1. People buy me to eat but they never eat me?
2. Try to name 5 consecutive days without using the names of weekdays or numbers?
3. If an electric train is travelling south which way is smoke going?

### A THREE FOR A STUDENT

#### TARGET :

- What you have learned through out your life
- How the next generation or present should remember you
- Why do they remember u

#### SUCCESS :

- What do u want to achieve
- How do you want to achieve
- When do u want to achieve

#### PERSONALITY :

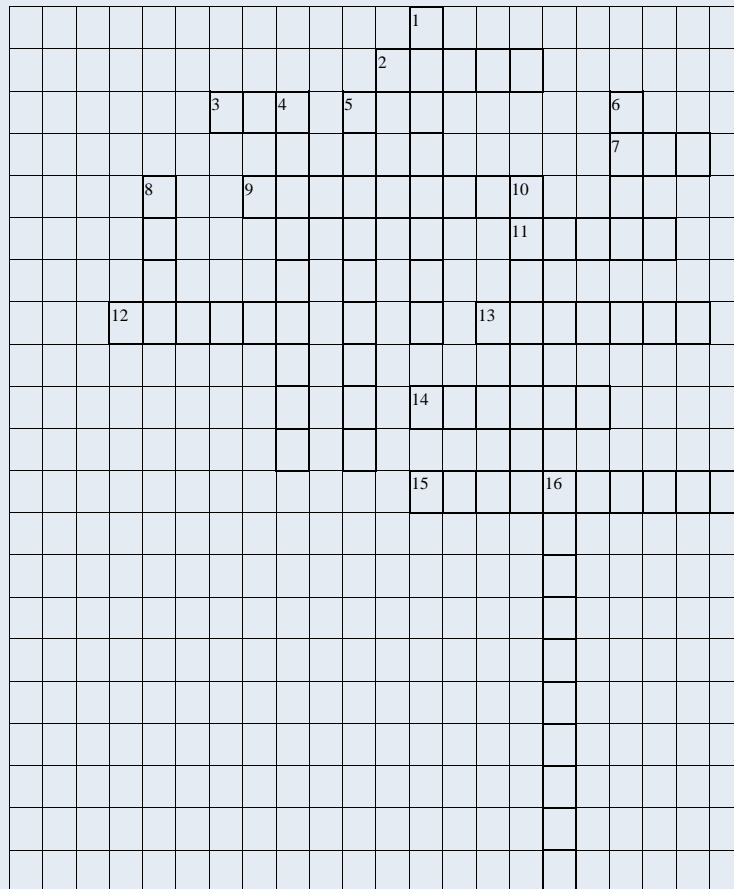
The personality of a person, group or a country can be decided by the behaviour with,

- Physically disabled people
- Older people
- Elders (juniors, under working employees.. Etc.)

These 3 category people's cannot capitulate with us for their rights.

( by K. Lakshmi Prasanna,16JG1A0214)

# CROSSWORD



## Across

- 2 passage of current through body
- 3 wiring size
- 7 a law
- 9 measures electrical potential
- 11 a type of ground
- 12 symbol 'T'
- 13 enclosed path of current
- 14 to turn on and off current
- 15 electromagnetic wave

## Down

- 1 measures electrical resistance
- 4 reference point in an electrical curren
- 5 measures electric power
- 6 symbol 'V'
- 8 protects against excessive current
- 1 electric component that transmits current
- 0
- 1 generates a continous output waveform
- 6

by Ch.Venu ( 14JG1A0204)

**THE SECRET TO  
SUCCESS**

A strong passion for any  
object will ensure success  
for the desire of the end  
will point out the means.

-Henry Hazlitt

Once a young man asked the wise man, Socrates, the secret to success. Socrates patiently listened to the man's question and told him to meet him near the river the next morning for the answer. The next morning Socrates asked the young man to walk with him towards the river. As they went in the river the water got up to their neck. But to the young man's surprise Socrates ducked him into the water.

The young man struggled to get out of the water, but Socrates was strong and kept him there until the boy started turning blue. Socrates pulled the man's head out of the water. The young man gasps and took a deep breath of air. Socrates asked, 'What did you want the most when your head was in the water?' The young man replied, 'Air.' Socrates said, 'That is the secret to success. When you want success as badly as you wanted the air while you were in the water, then you will get it. There is no other secret.'

**Moral of the short story:** A burning desire is the starting point of all accomplishment. Just like a small fire cannot give much heat, a weak desire cannot produce great results.

SPECIAL TALENTS



- Art by  
U.Bhuvaneshwari(16JG1A0234)



## PLACEMENTS & ACHIVEMENTS

Few of our students have been placed in various companies like INFOSYS, TCS, WIPRO, and many more.



## CAREER GUIDANCE

### TOP UNIVERSITIES

- Massachusetts Institute of Technology
- Stanford University
- Harvard University
- The University of California, Berkeley (UCB)

### TOP JOB SEEKERS WEBSITES

- Monster
- Naukri
- TimesJobs
- Fresherworld
- LinkedIn

**With a degree in Electrical and Electronics Engineering, you can find work in a wide range of sectors including aerospace, automotive, energy, IT and telecommunications**

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**Mrs. V.Sree Vidhya** : Assistant Professor, Department of EEE

**Chinta Mounika** : 14JG1A0203

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**L. Hari Chandana** : 16JG1A0216

**H. Akhila Sarvani** : 16JG1A0210

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