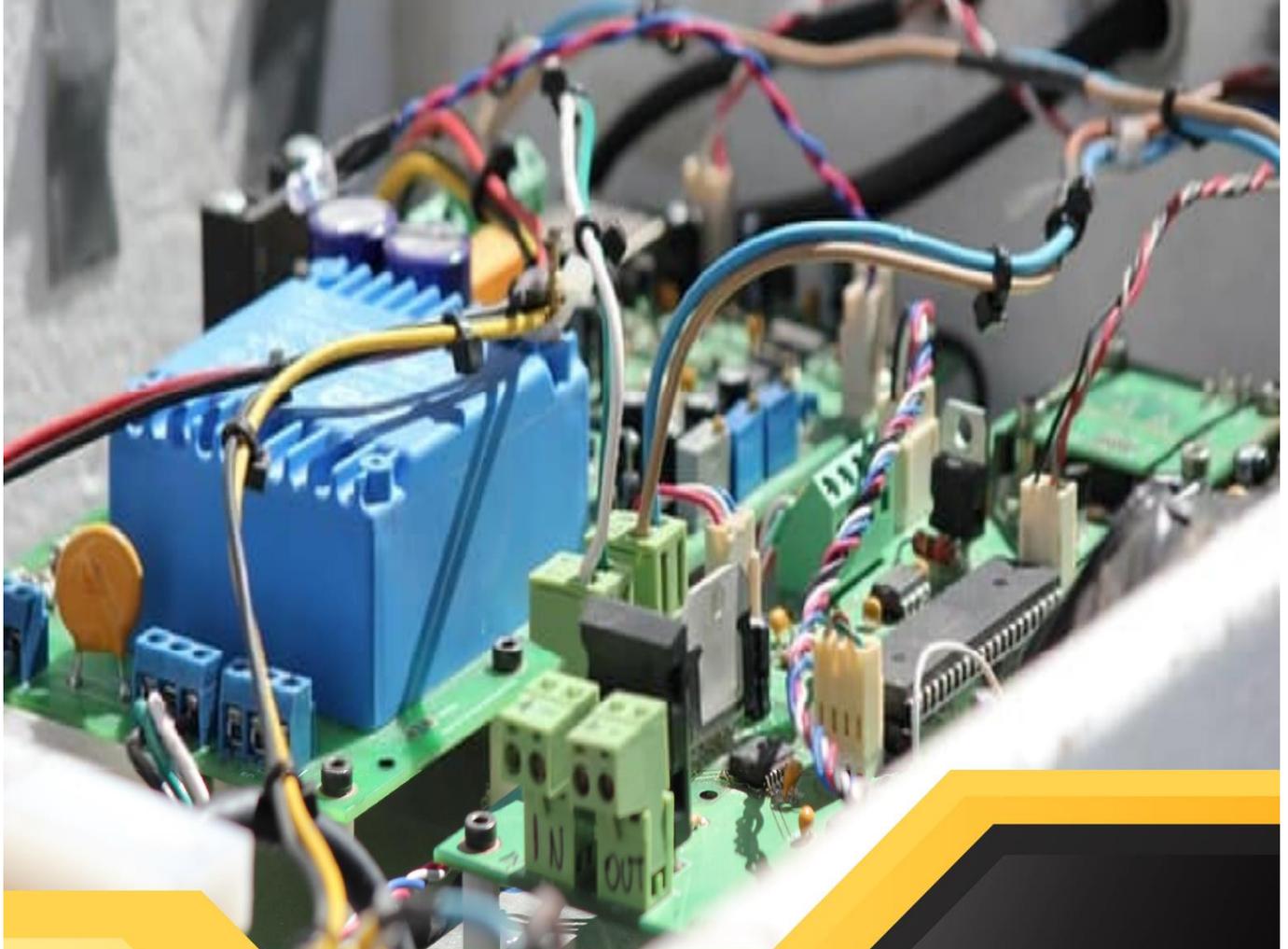


INSPIRE 2022



AEIE DEPARTMENTAL
MAGAZINE



✉ theinspire2020@gmail.com



Haldia Institute of Technology
Kshudiram Nagar, Haldia, Purba Medinipur, West Bengal 721657



HALDIA INSTITUTE OF TECHNOLOGY



ADVISORY COMMITTEE

Dr. Lakshman Chandra Seth, *Chairman, HIT*

Sri Sayantan Seth, *Vice Chairman, HIT*

Shri Ashish Lahiri, *Secretary, ICARE*

Prof. (Dr.), Subrata Mandal, *HIT*

Prof. (Dr.), A.B. Maity, *Dean, SASH, HIT*

ORGANISING COMMITTEE

Dr. Uday Maji, *HOD & Professor., AEIE Dept., HIT*

Mr. Debadatta Ghosh, *Associate Prof., AEIE Dept., HIT*

EDITORIAL COMMITTEE

Dr. Madhumita Das, *Assistant Prof., AEIE Dept., HIT*

MAGAZINE CORE MEMBER

Aashna Suman

Arpana

Abhinav Kumar

Chaitanya Manas

Rajib Manna

Subhadip Samanta

TABLE OF CONTENTS

SL No.	Topic	Page No
1	MESSAGES	5
2	OVERVIEW OF THE DEPARTMENT	9
3	DEPARTMENTAL LIBRARY	14
4	STUDENT CHAPTERS	15
5	BENEFITS OF INSTRUMENTATION	16
6	DESIGN DEVELOPMENT	17
7	PAINTING	21
8	LCR METER	22
9	75 TH INDEPENDENCE DAY	26
10	POEM	28
11	SKETCHING	29
12	MANDALA ART	30
13	EXPERIENCE IN AICTE-IDEA LAB	31
14	CREATIVE WORK	33
15	DESCRIBING A SKETCH	34
16	DRAWING	36
17	MECHANOVISION	37
18	GALLERY	43

FROM THE DESK OF PRINCIPAL, HIT



I am happy to know that the Department of Applied Electronics and Instrumentation Engineering is going to publish its annual technical magazine "**INSPIRE**" in **2022**. It is well known that knowledge is such a thing that gets perfection only by expressing and sharing with others. Swami Vivekananda believed education is the manifestation of perfection already in men. So, it has lot of other features besides conventional classroom teaching. Even we put efforts to impart education to match the advancement of technology; it would not be effective if it is not complimented with something where the thoughts of our young generation are reflected.

Technical magazine can play a major role to culture our thoughts and views towards its perfection. "**INSPIRE**" has many features which will in still many good qualities not only in our young generation but also in all of us involved in this activity. It will try to inculcate creativity, innovation and confidence on all of them. This magazine is a milestone that marks our growth, unfolds our imaginations, and gives life to our thoughts and aspirations. It unleashes a wide spectrum of creative skills ranging from writing to editing and even in designing the magazine. So, it is almost like dreams to get the magazine publish.

I congratulate the entire team of "**INSPIRE**" and the contributing authors for their hard work and dedication in making this dream into reality.

PROF.(Dr.) Subrata Mondal

PRINCIPAL,

HALDIA INSTITUTE OF TECHNOLOGY

FROM THE DESK OF
DEAN, HIT



It is a matter of great pleasure and satisfaction to know that the department of Applied Electronics and Instrumentation Engineering, Haldia Institute of Technology has taken the appropriate initiatives to publish the Technical Magazine, **INSPIRE-2022**. The magazine is poised to encapsulate the contributions by the faculty members, and the students of the department in terms of projects, working models and innovative products developed, research papers published, seminars/workshops/PDP organized, and different other co- curricular and extra-curricular activities.

The publication of such magazine is very much appropriate in the context of today's highly volatile and tumultuous professional world to remain competitive and market one's unique selling point. Additionally, such an attempt will bolster team work and encourage innovative thinking in different areas of technical education. The proposed magazine will definitely consolidate the credentials of the department and augment its reputation.

I appreciate the initiative taken by the department and congratulate all the members associated with the department. I wish all success in this endeavour.

PROF. T.K. JANA

**DEAN-SCHOOL OF ENGINEERING,
HALDIA INSTITUTE OF TECHNOLOGY**

FROM THE DESK OF

DEAN, HIT



I am extremely delighted that the Department of Applied Electronics & Instrumentation Engineering, Haldia Institute of Technology is going to publish its Techno-Cultural Magazine '**INSPIRE - 2022**', covering wide aspects of technological developments/ challenges as well as latest happening of the department.

In general, the platform of this Techno-Culture Magazine always offers strong connectivity for sharing of new and emerging technological information / ideas; developments of creative avenues of future-technologists through engineering product development / analysis, photography, literature, etc.

The practice of sharing of information through such magazine will redefine relationships at all levels of society including between teachers and students resulting with the enhancement of creativity and innovation in science education and technological design.

In this auspicious moment, I would like to congratulate all the members of the '**INSPIRE**'- the **Techno-Cultural Magazine of Applied Electronics & Instrumentation Engineering department** for their heart-full efforts to bring-out such novel concept.

PROF. A.B. MAITY

DEAN-SCHOOL OF APPLIED SCIENCE,

HALDIA INSTITUTE OF TECHNOLOGY

FROM THE DESK OF

HOD, HIT



A very warm congratulation to the magazine editorial committee and associated students and faculty members for successfully publishing this issue of departmental technical magazine cum newsletter "**INSPIRE-2022**" through extensive collective efforts and adequate guidance. **INSPIRE** has proven to be a cloud of information which inspires and instils confidence to the entire AEIE fraternity to express their original thoughts on technical topics. The magazine plays an instrumental role in providing exposure to the students to develop written communication skills and command over the language. It is a step towards building professional attitude in them.

The entire journey of creating **INSPIRE** inculcates leadership qualities, ethical attitude and social sensitivity among the students. This issue of **INSPIRE** has well covered topics like reading and evaluating technical papers which is the first step towards research and development. It also talks about career options available to them after graduation. Most importantly it focuses on the student achievements in the current academic year.

The magazine is beaming with enthusiasm and creative ideas giving it a fresh and grand look. On a concluding note, I would like to wish you all the very best for more such initiatives and future endeavours.

DR. UDAY MAJI

PROFESSOR & H.O.D, AEIE

HALDIA INSTITUTE OF TECHNOLOGY

OVERVIEW OF THE DEPARTMENT

DEPARTMENT OF APPLIED ELECTRONICS & INSTRUMENTATION ENGINEERING

[NBA ACCREDITED]

Applied Electronics and Instrumentation Engineering is a specialized branch of Electrical and Electronics Engineering, primarily focusing on the principles, operations, and sensing of measuring instruments, physical parameters used in the design and configuration of the process industry, and automated systems. This is a multi-disciplinary stream and covers subjects from various branches such as electrical, electronics, biomedical and computers.

Year of Establishment: 1996

Program Offered and Intake: 60

B. Tech. in Applied Electronics and Instrumentation Engineering

Current intake: 60

MISSION OF HIT

- To Impart quality and value-based education to raise satisfaction level of all stakeholders.
- To create competent, creative professionals, and great entrepreneurs who can work as individual or in group in multi-cultural global environments.
- To prepare citizens who would grow to be competent enough to contribute significantly with personal integrity & civic responsibility for the betterment of mankind throughout their careers & profession.

VISSION OF AEIE

- To become a dynamic contributor to the community by ensuring excellence in academic and research in the field of Applied Electronics & Instrumentation Engineering & to create an environment that will facilitate the growth of individual in this field through innovative teaching research & involvement of industry.

MISSION OF AEIE

- To produce quantity engineering graduates with the capacity of serving the arena of science, engineering, teaching, research, entrepreneurship & management.
- To add skill-set such as communication parameter, ethical inputs & to nature the characteristics lifelong learning.
- To ensure the capability of working in a team effectively in different environments & to add tenacity to build work force.

PEOs OF AEIE

PEO 1: To impart technical competency, knowledge, skill which ensure capability to solve problems in industry, Research & Academics related to instrumentation Engineering & other related disciplines.

PEO 2: To prepare the students to work effectively in various national or international public & private sector organizations.

PEO 3: To frame the mindset to enhance technical knowledge through lifelong learning may be in the structured or in the unstructured way. To impart the attributes towards successful adaptation to technological & cultural changes.

PEO 4: To add the capability to work as an individual or as a member of a team or as a team leader.

PEO 5: To fulfill the needs of society through their acquired in ethical & responsible manner.

PROGRAM OUTCOMES

1. **Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, & an engineering specialization to the solution of complex engineering problems.
2. **Problem Analysis:** Identify, formulate, review research literature, & analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences & engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems & design system components or processes that meet the specified needs with appropriate consideration for the public health & safety, & the cultural, societal, & environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge & research methods including design of experiments, analysis & interpretation of data, & synthesis of the information to provide valid conclusions.
5. **Modem tool usage:** Create, select, & apply appropriate techniques, resources, & modem engineering & IT tools including prediction & modeling to complex engineering activities with an understanding to the limitations.
6. **The engineer & society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal & cultural issues & the consequent responsibilities relevant to the professional engineering practice.
7. **Environment & sustainability:** Understand the impact of the professional engineering solutions in societal & environmental contexts, & demonstrate the knowledge of & need for sustainable development.
8. **Ethics:** Apply ethical principles & commit to professional ethics & responsibilities & norms of the engineering practice.
9. **Individual & team work:** Function effectively as an individual, & as a member or leader in diverse teams, & in multidisciplinary settings.
10. **Communication:** Communicate project management & finance: Demonstrate knowledge & understanding of the engineering & management principles & apply these to one's own work, as a member & leader in a team, to manage projects & in multidisciplinary environments.
11. **Life-long learning:** Recognize the need for, & have the preparation & ability to engage in independent & life-long learning in the broadest context of technological change.

FACULTY MEMBERES

Sl. No.	Name	Designation	Qualification	Area of Specialization
1.	Dr. Uday Maji	Professor & H.O.D	M. Tech, Ph.D. (Engg)	Biomedical Instrumentation
2.	Mr. Debadatta Ghosh	Associate Professor	M. Tech.	Instrumentation and Control
3	Dr. Madhumita Das	Assistant Professor	M. Tech., Ph.D.	Renewable Energy
4	Dr. Asim Halder	Assistant Professor	M. Tech.	Instrumentation and Control
5	Mr. Priyonko Das	Assistant Professor	M. Tech.	Instrumentation and Control
6	Mrs. Moumita Sahoo	Assistant Professor	M. Tech.	Instrumentation and Control
7	Mr. Rohan Mandal	Assistant Professor	M. Tech.	Instrumentation and Control
8	Dr. Soumya Roy	Associate Professor	M. Tech., Ph.D.	Instrumentation and Control
9	Mr. Somak Karan	Assistant Professor	M. Tech.	Instrumentation and Control
10	Mr. Soarabh Mandal	Assistant Professor	M. Tech.	Instrumentation and Control
11	Mrs. Sweta Bijali	Assistant Professor	M. Tech.	Instrumentation and Control
12	Mrs. Priyanka Rakshit	Assistant Professor	M. Tech.	Instrumentation and Control
INSTRUCTORS				
Mrs. Sutapa Maity, Mrs. Subhra Pramanik Maity, Ms. Saikat Karan, Mr. Sovan Maity				
GENERAL ASSISTANT Mr. Atanu Tripathy				

MAJOR LABORATORIES

- *Process Control Laboratory*
- *Control System Laboratory*
- *IoT Laboratory*
- *Industrial Instrumentation Laboratory*
- *Instrumentation and Design Laboratory*
- *Electronic Measurement Laboratory*
- *Telemetry Laboratory*
- *Sensor Laboratory*
- *Microprocessor Laboratory*
- *Electrical and Electronic Measurement Laboratory*

DEPARTMENTAL LIBRARY

The Department Library has an assortment of 1218 books with a volume of 773 numbers of different books and journals besides the central library facility.



STUDENTS' CHAPTER



The International Society of Automation (ISA)-2015 10th Oct

The International Society of Automation (ISA) is a society which serves automation professionals around the world. Our department opened a student chapter on 10th October, 2015, under the ISA Kolkata chapter. Many workshops and seminars have been organized jointly by the department and the ISA student chapter since 2015.



Instrument Society of India (ISOI)-2018

The Instrument society of India (ISOI) is a society of Instrumentation professionals established in the year 1970 with headquarters at Indian Institute of Science (IISc), Bangalore. Our department has an ISOI chapter under which various seminars, workshops have been conducted. The department has recently got approval from The Institution of Engineers, India to run the student's chapter to prop up the professional activities.

BENEFITS OF INSTRUMENTATION

AASHNA SUMAN (ROLL NO - 05519001)

These graduates monitor and control machinery. Instrumentation engineering degree holders work in industries and improve productivity, reliability, safety, optimization, and stability. These industries should have automated processes that help in improving the above qualities.

Instrumentation engineering is the branch of engineering that specialises on the principle and operation of measuring instruments that are used in fields of design, configuration of automated systems in electrical, pneumatic domains, etc.

The required tasks are very domain dependent; instrumentation engineers typically work for industries with automated process with the goal of improving the productivity, reliability, safety, optimisation and stability. Instrumentation engineers are commonly responsible for integrating the sensors with the recorders, transmitters, displays or control systems. They may design or specify installation, wiring and signal conditioning. They may be responsible for calibration, testing and maintenance of the system

- They may develop electrocardiograph equipment and computed tomography scanners or may work on security systems.
- They also play essential role in every successful aeronautical research projects.
- They find employment in manufacturing firms, defence contractors, biomedical companies, government, or work for private engineering firms.
- Design and develop control systems.
- Maintain the existing control systems.
- Manage the control systems.
- Collaborate with design engineers, purchasers and other staff members involved in the production processes.
- Ensure that the instruments comply with health and safety regulations.
- Salary of an Instrumentation engineer in India is an average of Rs 389,446 per year. Experience and skills will increase the pay for this job naturally.

INTRODUCTION

The PID Controller Most Commonly Used Dynamic Control Technique. The acronym PID stands for Proportional-Integral-Derivative control. Of all control design techniques, the PID controller is the most widely used. Approximately **95%** of the closed-loop operations of the industrial automation sector use controllers are of the PID variety.

Temperature control is required in nearly each and every field of application such as household, industrial, research and other such applications. In this paper article, we present over view of our Project. The temperature control system is used widely in industries. In this, the plant is an electric oven or a heater whose temperature is to be controlled with respect to the reference input and control.

In this system are the Temperature is play for Major role. In temperature control system, there is the transfer of heat from the heater coil to the oven and the leakage of heat from the oven to the atmosphere. There are three modes of heat transfer viz. Conduction, convection, and radiation. Heat transfer through radiation may be neglected in the present. For conductive and convective heat transfer is given by

$$\text{equation (1)} \\ \theta = \alpha \Delta T$$

Where, θ is the rate of heat flow in joule/sec
 ΔT = temperature difference in
 α = constant Under assumptions of linearity, the thermal resistance is defined as
 $R = \text{temperature difference} / \text{rate of heat flow} = (\theta / \Delta T)$.

This is analogous to electrical resistance defined by $I = V/R$.

In the similar pattern thermal capacitance of the mass is

$$\text{given by equation (2)} \\ \theta = C d(\Delta T)/dt$$

Which is analogous to the V-I relationship of a capacitor, namely

$$I = CdV/dt.$$

In the case of heat,

$C = \text{rate of heat flow} / \text{rate of temperature change}.$

The equation of an oven may now be written by combining the above two equations, implying that a part of the heat input is used in increasing the temperature of the oven and the rest goes out of loss. Thus

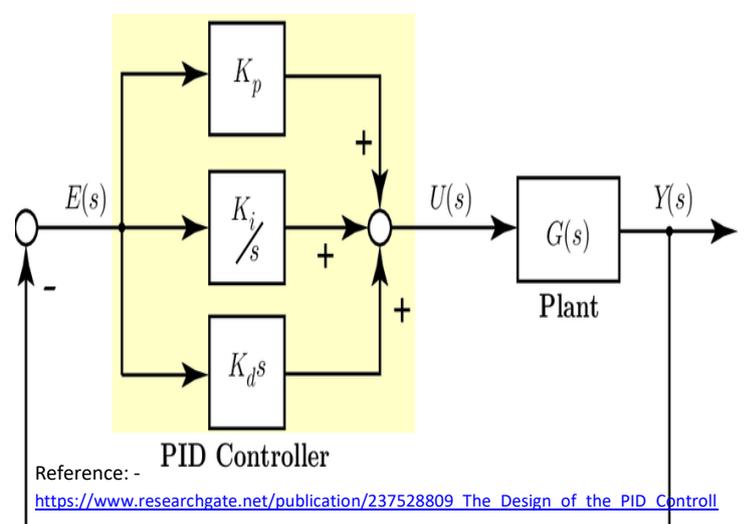
$$\theta = C d(T)/dt + R - T \quad (3).$$

With an initial condition $T(t=0) = T_{amb}$. Now, taking Laplace transform with zero initial condition

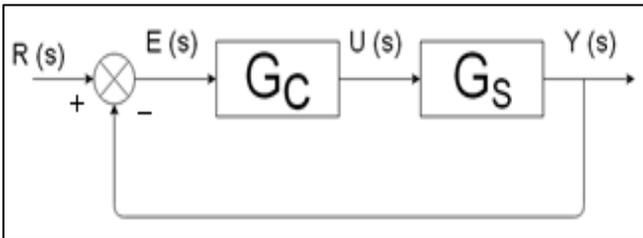
$$T(s) / \theta(s) = R / (1 + sCR)$$

What is a PID controller?

The acronym PID stands for Proportional-Integral-Derivative control. Each of these, the P, the I and the D are terms in a control algorithm, and each has a special purpose. Sometimes certain of the terms are left out because they are not needed in the control design. This is possible to have a PI, PD or just a P control. It is very rare to have a ID control.



PID controller is the most widely used controller in the industry. A PID controller has three parameters- proportional constant 'K_P', integral constant 'K_I' and the derivative constant 'K_D'. These three parameters are meant to take care of the present, future and the past errors. A PID controlled process having system transfer function 'G_s' and unity

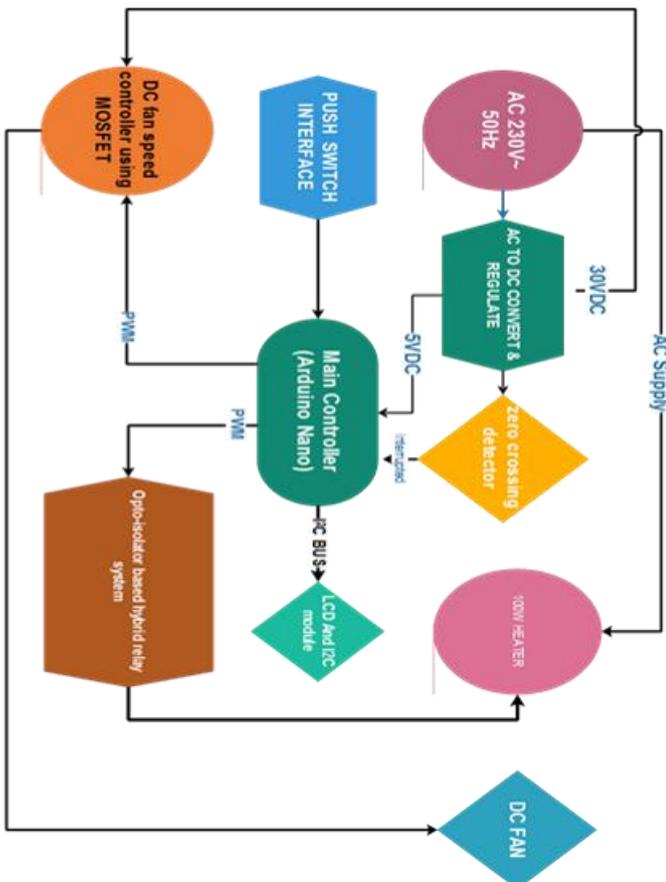


G_c' is the transfer function of the PID controller and is given by equation (4) and (5)

$$G_c = K_p + \frac{K_I}{s} + K_D s \quad (4)$$

$$G_c = K_p \left(1 + \frac{1}{T_i s} + T_d s \right) \quad (5)$$

PROJECT BLOCK DIAGRAM



➤ OVERVIEW

In this project we have Main Controller As use as 'Arduino Nano' AKA Based on Micro Chip (Atmel) ATMEGA 328AU. And we have used mainly Temperature sensor as DS18B20. Final element is 100w Solder iron Heater Coil.

Some extra component is 16x2 LCD with I²C module & Some Push Switch, zero crossing detector, Opto-isolator based hybrid relay system, DC fan speed controller using MOSFET.

Why Arduino Nano is used?

Arduino Nano is one type of microcontroller board, and it is designed by Arduino.cc. It can be built with a microcontroller like Atmega328. This microcontroller is also used in Arduino UNO. It is a small size board and also flexible with a wide variety of applications. Arduino boards are mainly used to build electronic projects. embedded systems, robotics, etc. But the nano boards are mainly introduced for the beginners who are not from the technical background.



Why DS18B20 is used?

Basically, DS18B20 is a Semiconductor type Digital temperature sensor. This is allowing you to wire multiple sensors to the same data wire. So, you can get temperature from multiple sensors using just one Arduino digital pin. The DS18B20 temperature sensor is also available in waterproof version. In our case we have three DS18B20 temperature sensor used in different location.



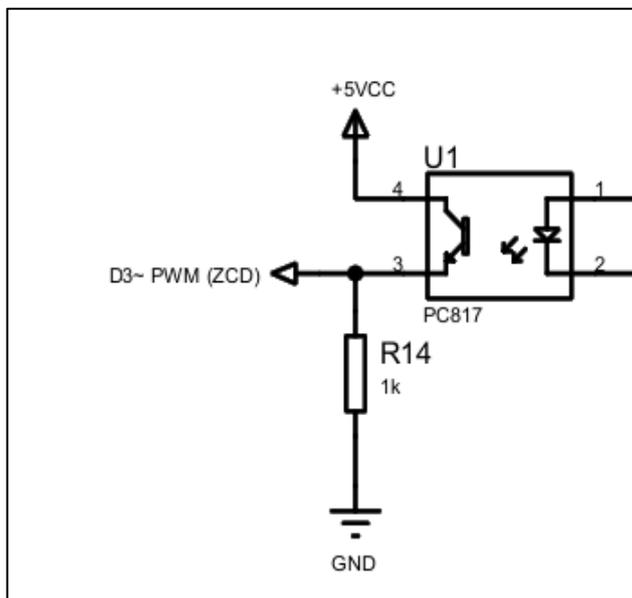
Why DS18B20 is used?

This is a 16x2 LCD display screen with I2C interface. It can display 16x2 characters on 2 lines, white characters on blue background. Usually, Arduino LCD display projects will run out of pin resources easily, especially with Arduino Uno. And it is also very complicated with the wire soldering and connection. This I2C 16x2 Arduino LCD Screen is using an I2C communication interface. It means it only needs 4 pins for the LCD display: VCC, GND, SDA, SCL. It will save at least 4 digital/analog pins on Arduino



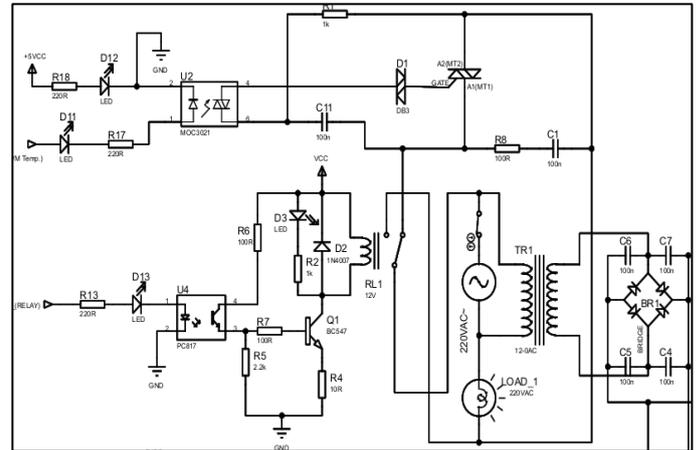
Why zero crossing detector is used?

Zero crossing detectors basically detect zero voltage points and inform the controller or controller circuit. It helps to minimize high-rate change of current with respect to time (di/dt) as result less heating and start up current in the load which improves life time of load such as motors and heaters.



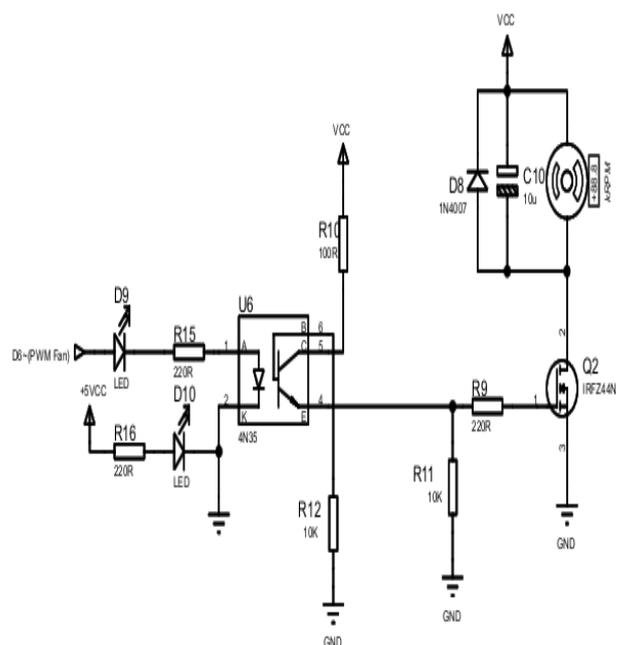
Why Opto-isolator based hybrid relay is used?

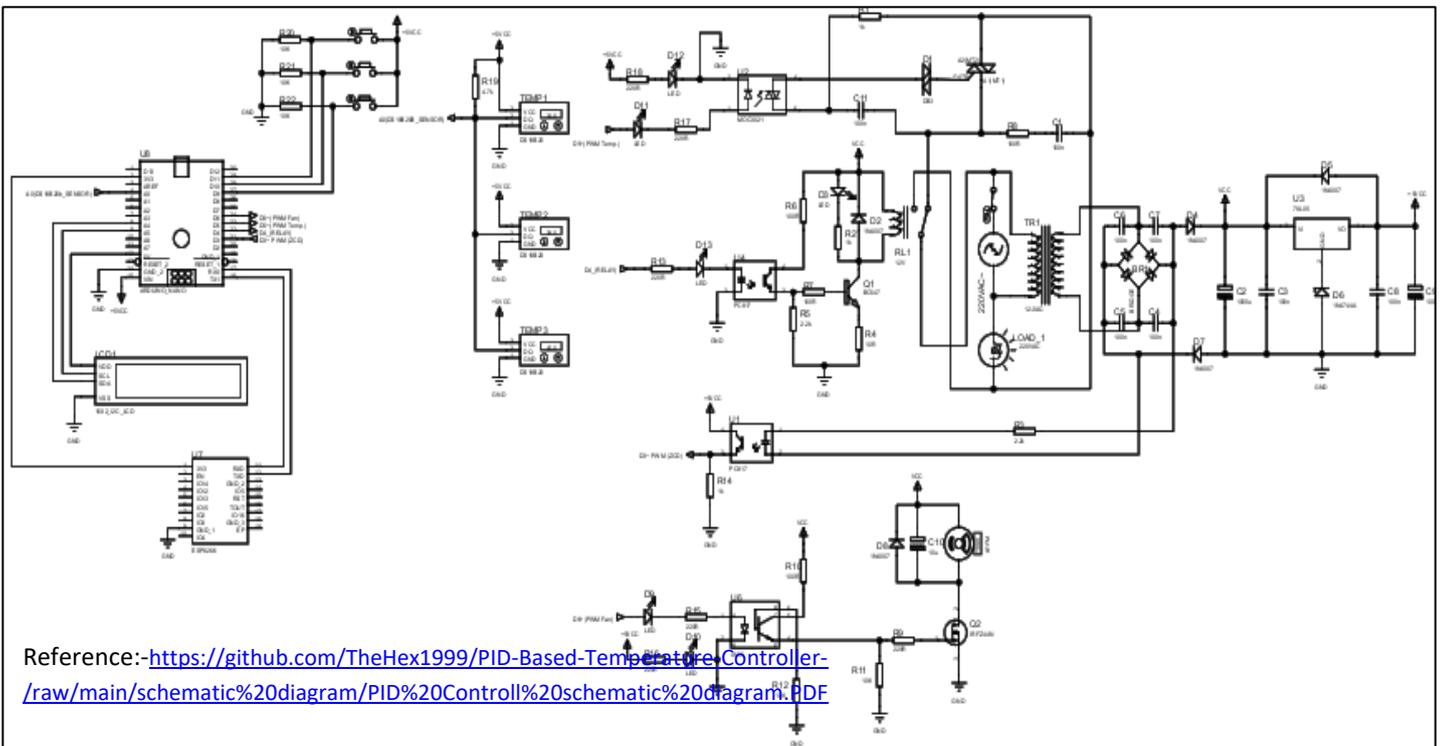
The Power efficiency of the Hybrid relay is high as the electro mechanical relay contacts have less resistance so the conduction loss is very low as compared to Triac if used alone. There is no dependent mechanical relay and control the power factor of any kind of inductive load



Why DC fan speed controller using MOSFET is used?

To control the speed of the DC fan using the PWM signal, we need to use a switch which can be switched on and off at PWM frequency and hence control the supply voltage across the motor of the DC fan. This switch can be made by using a high switching speed power MOSFET





➤ **CONCLUSION**

The device is working good but sometime this device not like commercial one. So, I am still working on this project, I find many different ways to reduce Error & try to make a commercial one.

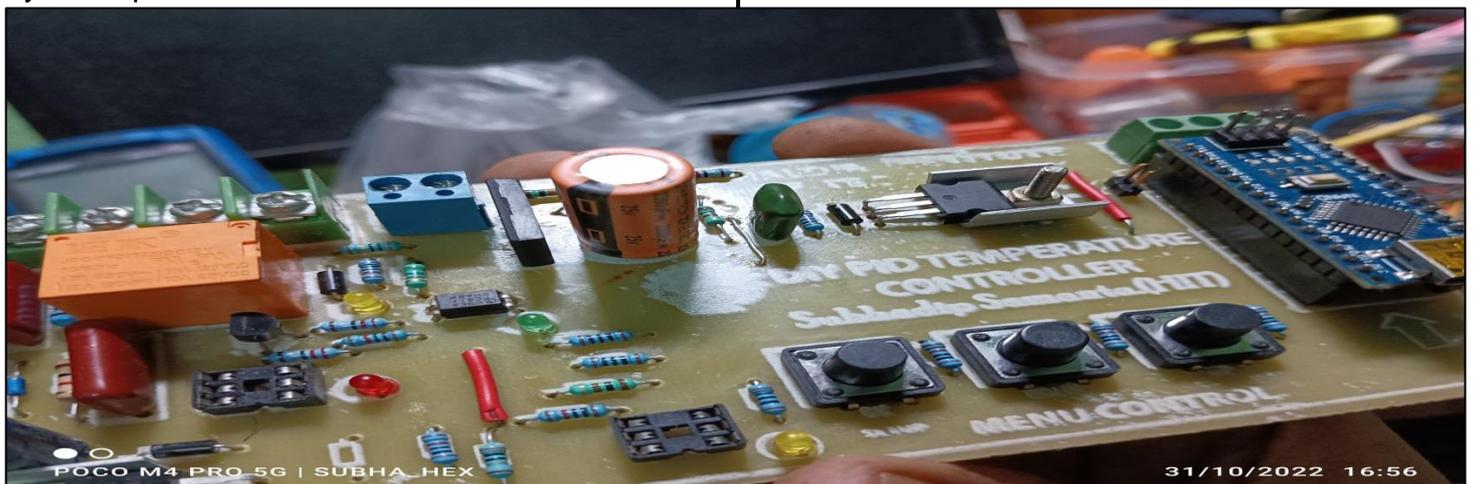
Feature I have replaced Arduino Nano (Atmega Switch to STM32. Because it quit good Feature like 12-bit ADC and it is MCU is 32 bits. You can try to make your own PID Based Temperature Controller.

➤ **ABOUT**

First of all, a big thanks for appreciate my article. My name is Subhadip Samanta. I am pursuing B. Tech in AEIE (applied electronics and instrumentation engineering). I completed my Diploma in DEIE from Dr. Meghnad Saha Institute Of Technology, Haldia. And I have 1.3-year Experience on Oil and Gas Plant.

➤ **REFERNECE**

- <https://www.arduino.cc/reference/en/>
- https://www.researchgate.net/publication/267869482_Design_of_a_high-resolution_PID_temperature_controller_for_use_in_a_low-cost_thermoluminescence_system
- <https://circuitdigest.com/microcontroller-projects/arduino-pid-temperature-controller%23~:text=As%20the%20name%20suggests%20a,the%20current%20temperature%20and%20setpoint.>
- <https://blog.arduino.cc/2018/04/16/pid-temperature-control-with-arduino/>
- http://electronoobs.com/eng_arduino_tut24_parts1.php



PAINTING

LABLI GIRI



LCR Meter

RAJIB MANNA (L21/EIE/45)

LCR Meter is basically used for measuring unknown inductance, resistance and capacitance.



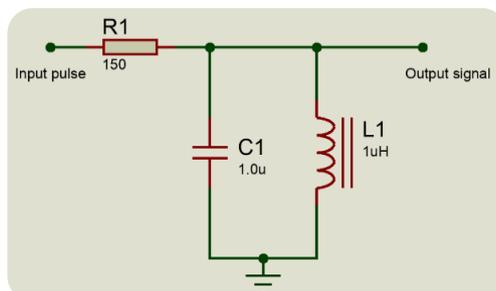
Project overview

This is my second-year college project. I decided to make that type of device because the LCR meter is very expensive and it's not easy to build. The device has an error less than $\pm 3\%$.

I use an atmega328p microcontroller as the brain of this device. Little bit of circuit theory is present to build this device. I divide the project into three parts. (Inductor measurement, capacitor measurement, resistor measurement). The device has some extra features like PWM output, LED testing. The programming part is very big that I will not go to discuss. I will talk about the main thing in very short. If you need more details check my git profile. Let's clear one by one.

Inductance Measurement

Most of the processes are available to measure the Inductor, they use AC source. The device does not have any AC supply, because I use Battery to power up my device. That is why I decided to use an LC resonant tank circuit. An inductor in parallel with a capacitor is called an LC circuit, and it will electronically "ring" like a bell. Well regardless of the frequency or how hard a bell is struck, it will ring at its resonating frequency. We will electronically strike the LC bell, wait a bit to let things resonate, then take a measurement.



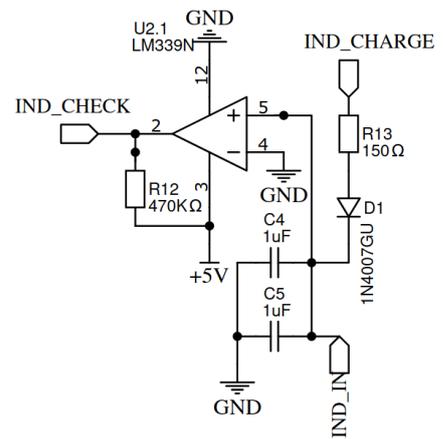
Formula for resonant frequency

Where,

f=Frequency (Hz)

L=Inductance (H)

C=Capacitance(F)



INDUCTOR SECTION

The resonance frequency is a sine wave frequency, but the microcontroller can't read it. I converted the sine wave frequency to a square wave using an opamp. (Op-amp comparator)

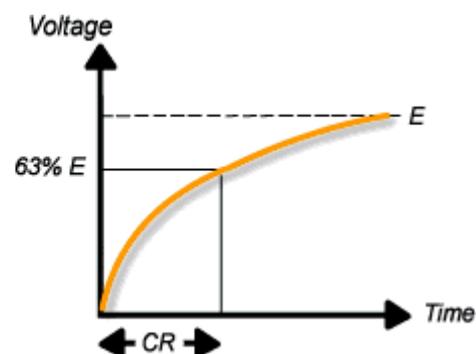
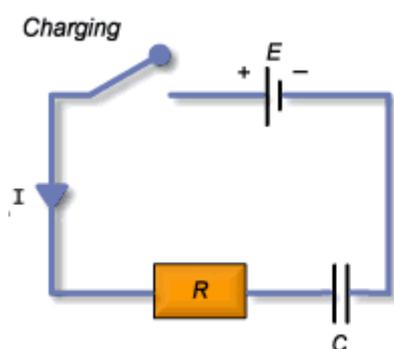
Op-amp IC- LM339, LM329 (LM339 Quad differential comparator)

The Atmega 328p has a special timer interrupt, timer input capture interrupt. This interrupt is able to capture the high or low pulse time. (For more information <https://www.electronicwings.com/avr-atmega/atmega1632-timer-input-capture-mode>). For this task, I used the " pulseIn(PIN, HIGH); " function in the Arduino.

Note: The pulseIn function does not use the interrupt, It can block your code flow. If you need more accurate results, please use pulseInLong function. If you are comfortable with pulseIn function , then you can turn off all timer interrupts, but if you turn off the timer interrupt, the millis function can stop working.(If you just start arduino programming, do not change the default timer interrupt setting.)

Capacitor Measurement

I use the easiest process to measure capacitance RC circuits. The most important thing about this circuit is Power supply. To measure the capacitance, I need a very stable output voltage power supply. I use a boost converter as a power supply, the power supply has feedback and it is working in 180 kHz PWM signal.



Formula of Time Constant:

$$T_c = R \times C$$

Where,

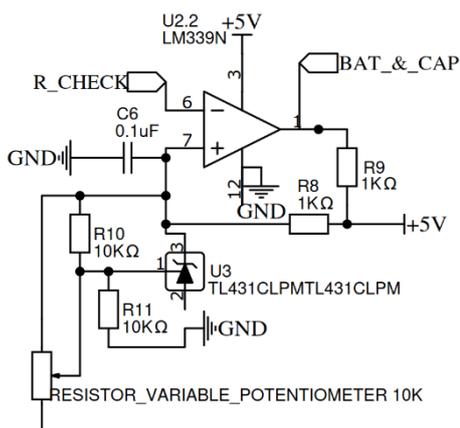
R = Resistance (Ω)

C = Capacitance (F)

Tc = Time constant (Sec)

The **time constant** of a capacitor is defined as the time it takes for the voltage across the capacitor to reach **63.2%** of its voltage when fully charged. Larger capacitors take longer to charge, and therefore have larger time.

Now I need a circuit to detect the 63.2% charge time. I use an opamp to detect the charge time, I give the 63.2% power supply voltage to the op-amp non-invers pin. (Supply voltage = 5 V, 63.2% voltage is 3.16V and set voltage 3.159V.) I connect invers pin direct to the capacitor. (Ignore the op amp internal impedance because the input impedance is very High.) Now my circuit shows a falling edge when the capacitor is charged above 63.2% voltage.



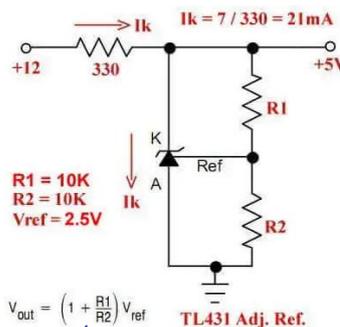
63.2% CHAEGE TIME CHECK

Why do I use TL431 IC?

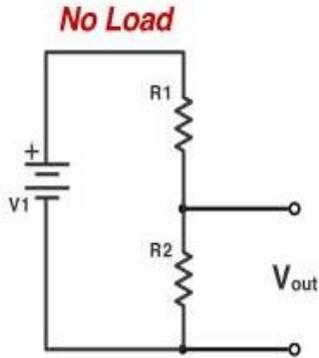
When I need some fixed voltage and low current, I always use a Zener diode, but you know Zener diode is not available for any voltage, that's why I chose the TL431. In single line TL431 is a variable Zener diode. Following this circuit, you can achieve any stable output voltage.

In the program part I use a hardware interrupt to check the charging time. If you have any queries about programming then you can send an email.

Note: Why not use ADC to monitor the charge time? At first, I was using an ADC, but the result is so noisy. Then I decided to use this simple process.



Most easy part of this project, trust me, it's not easy what you think, because in the practical field any component is not ideal. I will try to explain in an easy way. The common two processes are used to measure the resistance. **1.** Measure the circuit current and voltage and apply the ohm's law. **2.** Use a voltage divider circuit. I used the second option. Voltage divider is a common circuit and it is used everywhere.



In this circuit I just care about the voltage, not current. In my case the R1 resistor is an unknown resistor. I use the atmega328p internal ADC converter to find out the voltage and the ADC voltage reference is 5V. I use a range selection circuit to change the range. The device can change the range automatically. don't worry about this. check my circuit diagram, I think you can easily understand the concept.

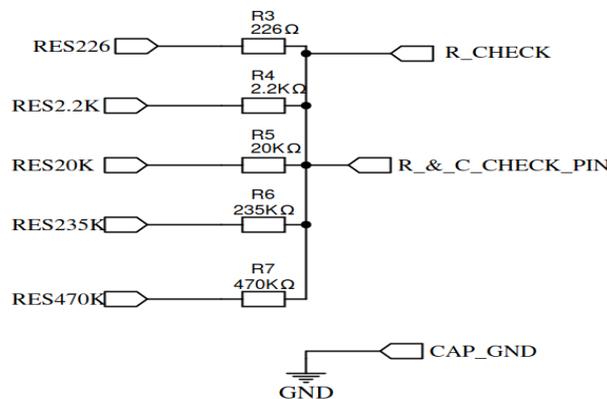
$$V_{out} = V_1 \frac{IR_2}{I(R_1 + R_2)} = \frac{V_1 R_2}{(R_1 + R_2)}$$

The unknown resistance will connect with the GND and R_CHECK pin. The other resistors are used to change the range. Find R1 resistor value.

$$R_1 = R_2 \{(V_{in}/V_{out}) - 1\}$$

How to convert the ADC value to Voltage?

Output Voltage = (Input Voltage x ADC value) / ADC Max value



RESISTOR & CAPACITOR SECTION

Note: In the beginning I said that "it's not easy". There are two big problems in resistor measurement. 1. Temperature. 2. ADC resolution. You know that the atmega328p has a 10-bit ADC. The maximum value of the ADC is 1023. It can only measure 4.8875mV step. So, ADC is not perfect for this project. For solving the temperature problem, I use MFR resistor with 1% tolerance, but the 0.25% tolerance resistor is perfect for this application. If you try this project, you can face noise problems.



POEM

ANKUSH KUMAR

बदले थे वो भी इश्क़ था,
संभलें हैं ये भी इश्क़ है...!



खुद को खोए थे वो भी इश्क़ था,
खुद को पा रहें हैं ये भी इश्क़ है...!



तुझ से जुड़े थे वो भी इश्क़ था,
खुद से मिल गए ये भी इश्क़ है...!



तुझे खुदा मान था वो भी इश्क़ था,
अब खुद की तलाश में हैं ये भी इश्क़ है...!



तेरे साथ चलना वो भी इश्क़ था,
खुद के ख्वाबों के साथ दौड़ना ये भी इश्क़ है..!



बिखरें थे वो भी इश्क़ था,
निखरें हैं ये भी इश्क़ है...!



-अंकुश

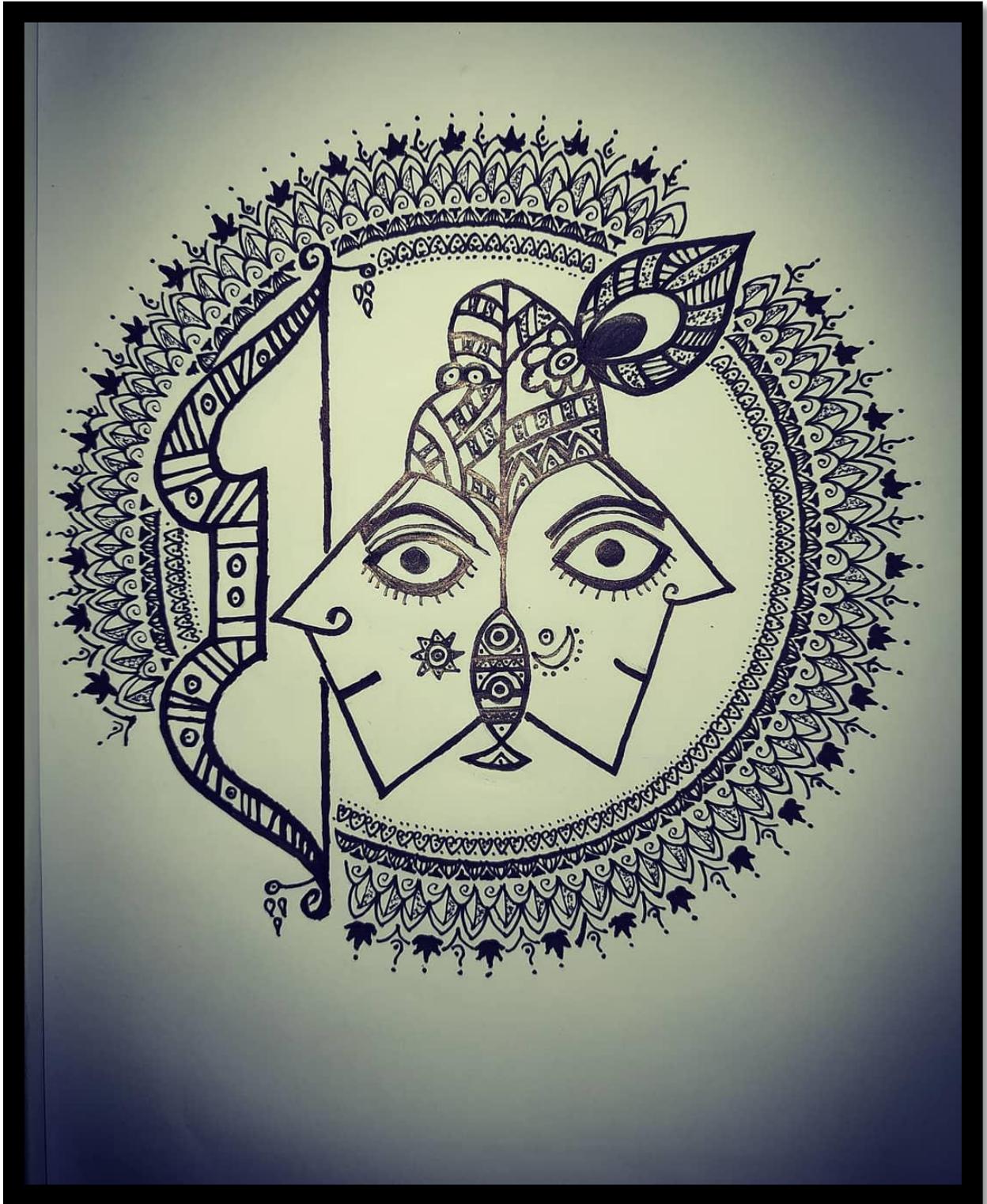
SKETCHING

CHAITANYA MANAS (20/EIE/18)



MANDALA ART

CHAITANYA MANAS (20/EIE/18)

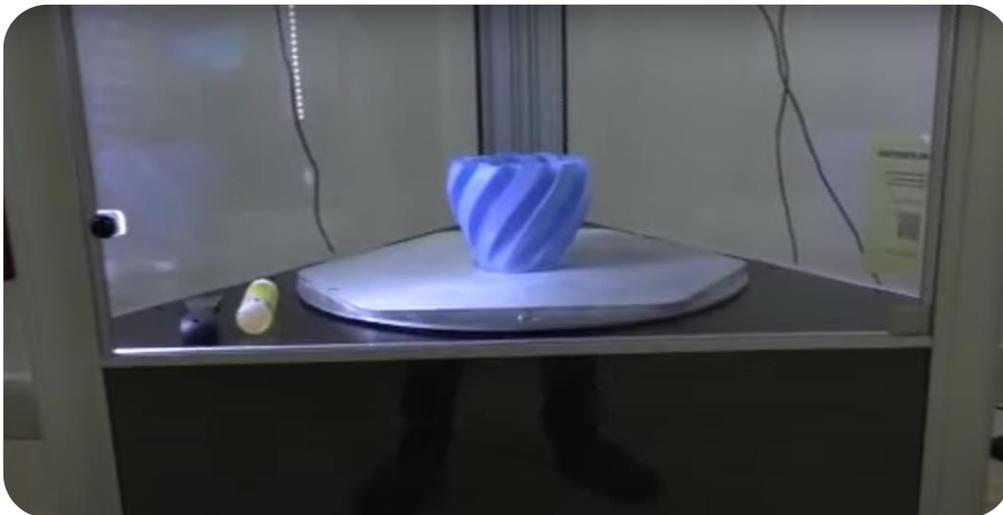


EXPERIENCE IN AICTE-IDEA LAB

ABHINAV KUMAR (20/EIE/002)

AICTE has launched a scheme for establishing AICTE-IDEA (Idea Development, Evaluation & Application) Lab in its approved institutions for encouraging students for application of Science, Technologies, Engineering and Mathematics (STEM) fundamentals towards enhanced hands-on experience and learning by doing. As a common facility embedded in the institution, IDEA Lab facilitates the students to “engage, explore, experience, express and excel.” These Labs are functioned 24x7 in the institutions selected and be available to the colleges, schools, and industries around also.

In our college, Haldia Institute of Technology, there is also an IDEA LAB by AICTE, which is very well designed and different sections are categorised. This beautiful lab is generally run by the students of our college only. The teachers are just to guide. In the IDEA LAB, there are four sections (or chambers). As we enter the Lab, the first chamber is of PCB Design Room, then as we move forward, we have 3d Printing Room, after then there is Laser Cutting Room and at last there is Wood Designing and Cutting Room. Here different machines are available like PCB Fabricating machine, 3D Printer, Laser cutting machine and Wood Cutting machine.



Prototype made in IDEA LAB by 3D Printer

I also got an opportunity to work there. There was a workshop held there and with my few classmates I went to the IDEA Lab first time, it was very interesting to see the devices. The where few students, who were already working on some projects. They introduced us with the machines and explained how they worked. In the PCB Designing Room, we worked on the basic circuit. It was very easy to design the circuits in the PCs. Then the designed circuit information was fed in PCB Fabricating Machine, with little more setting and information, the

machine automatically, drilled and printed the circuit on the blank PCB board. Then after the etching process (for etching process, chemicals like Sulphuric Acid, Hydrogen Peroxide, etc is mixed in proper ratio), the circuit came out very clean and clear. After the components were joined, it was a fully working circuit.

Then I experienced working on the Wood Cutting machine. There we designed a small You Tube play button (logo). In PC we designed the logo using various tools present in the software, we designed the border first, then using different shapes we designed the play button, then we designed to raise the play button and then the surrounding part of the play button. Then the designed information is copied in a secondary storage device and then that information was fed in the wood cutting machine. A piece of wood is hold with the help of clips under the needle of the machine, axes (x, y and z) are set and then machine is switched on for work. After some time, the beautiful result was there. Approximately 7x3x0.5 cm dimensioned a You Tube Logo was in our hand. It was neatly cut and designed.



Wood Cutting Machine

Then we experienced prototype designing in 3D-printing machine. There also designs, were made in a software and the designs were fed in the 3D printer using secondary storage device. The Printer has a metal plate on which designs are made, there is are three arms that works as the three axes, i.e., x, y and z. Nylon PA 12 is used to make the prototypes. It takes some time to make a small prototype but to a little larger item (like decorative flower pot) takes approximately 5-7 hours. But after such a long wait, the output is very fruitful.

And at last, Laser Cutting Machine makes designs by cutting on any items like plastic boards. It is a dangerous machine as lasers can harm us so we had to handle it carefully. It also works on software. We make designs and send the data to the machines directly, and then print the desired designs.

It was a very handsome experience to work on these machines and the students working there helps a lot and the teaches also guides very nicely. So, if any student has any ideal, it is the best place to put up the ideas and work on it.

CREATIVE WORK

SWECHA SINHA (21/EIE/033)



Idol of Lord Ganesha made up of Soil

DESCRIBING A SKETCH

CHAITANYA MANAS (20/EIE/18)



Zeus, the king of the gods in Greek mythology, is often associated with time and the changing seasons. As the ruler of the skies, Zeus was responsible for controlling the weather and the passage of time, making him a powerful figure in the ancient world.

In Greek mythology, Zeus was the son of Cronus and Rhea, two Titans who ruled the universe before the Olympian gods. According to legend, Cronus was fearful of being overthrown by his children, so he swallowed each of his offspring as soon as they were born. However, when Rhea gave birth to Zeus, she hid him away on the island of Crete and tricked Cronus into swallowing a rock instead.

As Zeus grew older, he became known for his strength and his ability to control the forces of nature. He was often depicted wielding lightning bolts, which were said to be his weapon of choice in battles against other gods and monsters. With his mastery over the weather, Zeus was able to create thunderstorms and rain, as well as control the changing seasons.

One of the most famous stories about Zeus and his control over time involves the myth of Demeter and Persephone. According to the myth, Persephone was the daughter of Demeter, the goddess of agriculture and the harvest. One day, while picking flowers in a field, Persephone was kidnapped by Hades, the god of the underworld, and taken to his realm.

When Demeter realized that her daughter was missing, she became inconsolable and refused to let any crops grow. As a result, the world plunged into a perpetual winter, with no signs of spring or summer. Eventually, Zeus intervened and brokered a deal between Demeter and Hades, allowing Persephone to spend part of the year in the underworld and part of the year with her mother.

Zeus' role in this story shows how he was seen as a mediator between the gods and mortals, as well as a powerful force that could control the natural world. His control over the changing seasons was seen as a reflection of his power over time itself, and his lightning bolts were said to symbolize the fleeting nature of life.

In modern times, Zeus continues to be a popular figure in literature, film, and popular culture. His association with time and the passage of seasons has made him a symbol of change and transformation, as well as a reminder of the power of nature over human affairs. Whether as a figure of myth or a symbol of inspiration, Zeus remains a powerful force in our cultural imagination.

DRAWING

SWECHA SINHA (21/EIE/033)

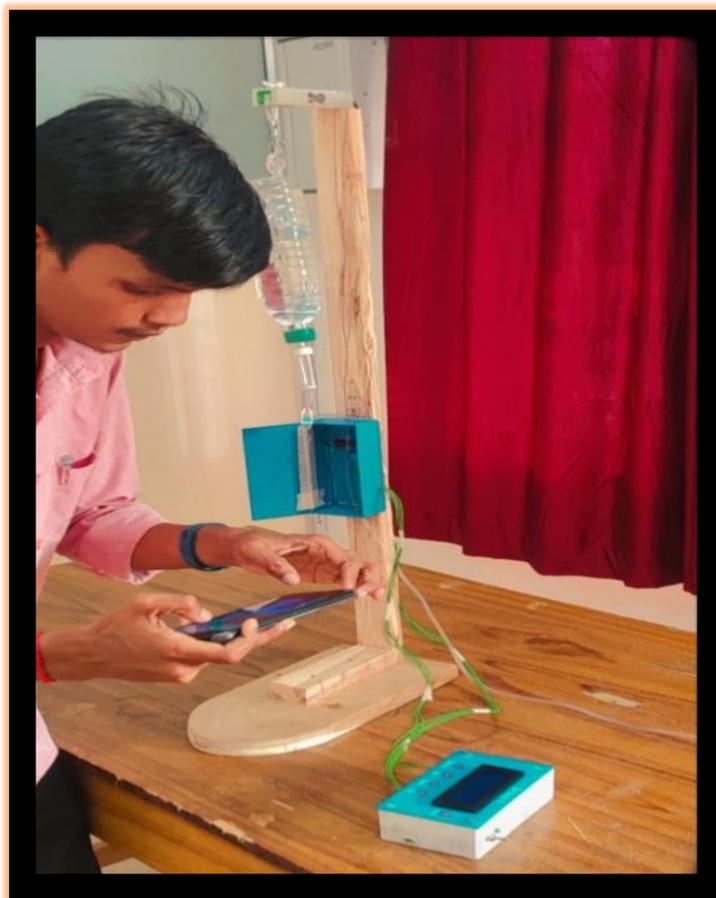


MECHANOVISION

MECHANOVISION was a Technical Presentation presented by ME Club from IDEA LAB. There was a small Event held in which some group of students presented their innovative ideas.

Here are some of the Ideas by Students:

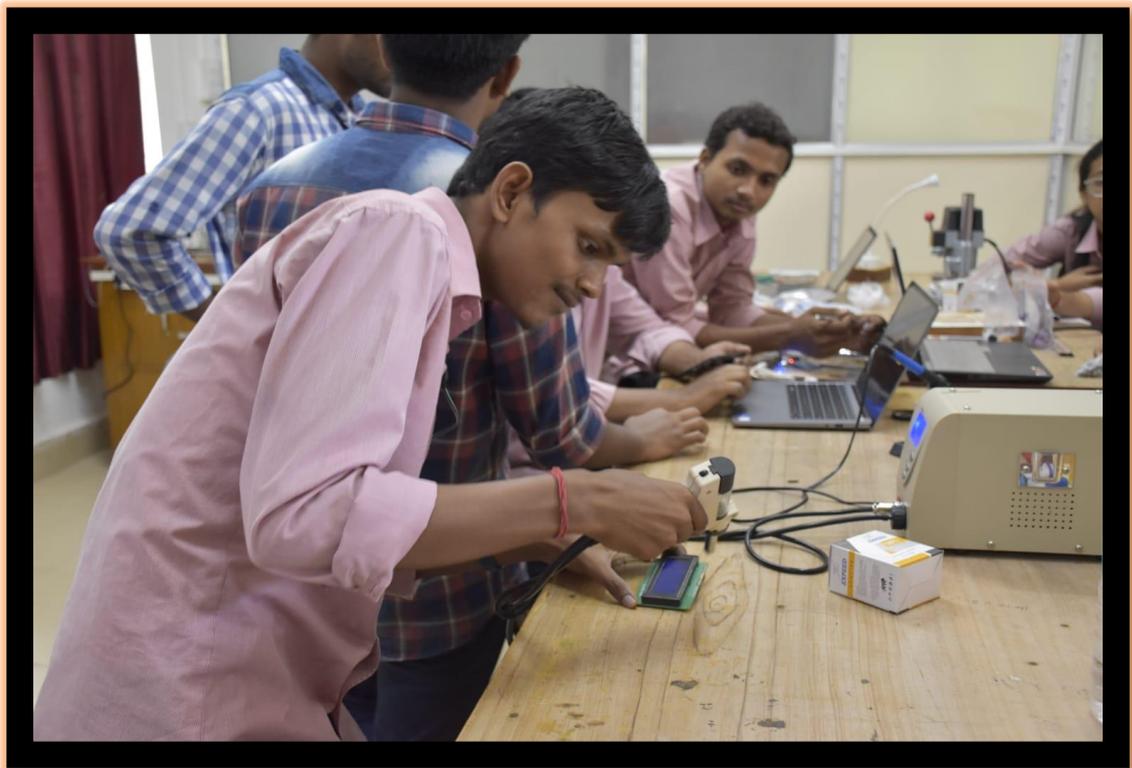
IOT BASED IV BAG MONITORING AND ALERTING SYSTEM



Model of *IOT based IV Bag Monitoring and Alert System*



Presenting their work on the Model



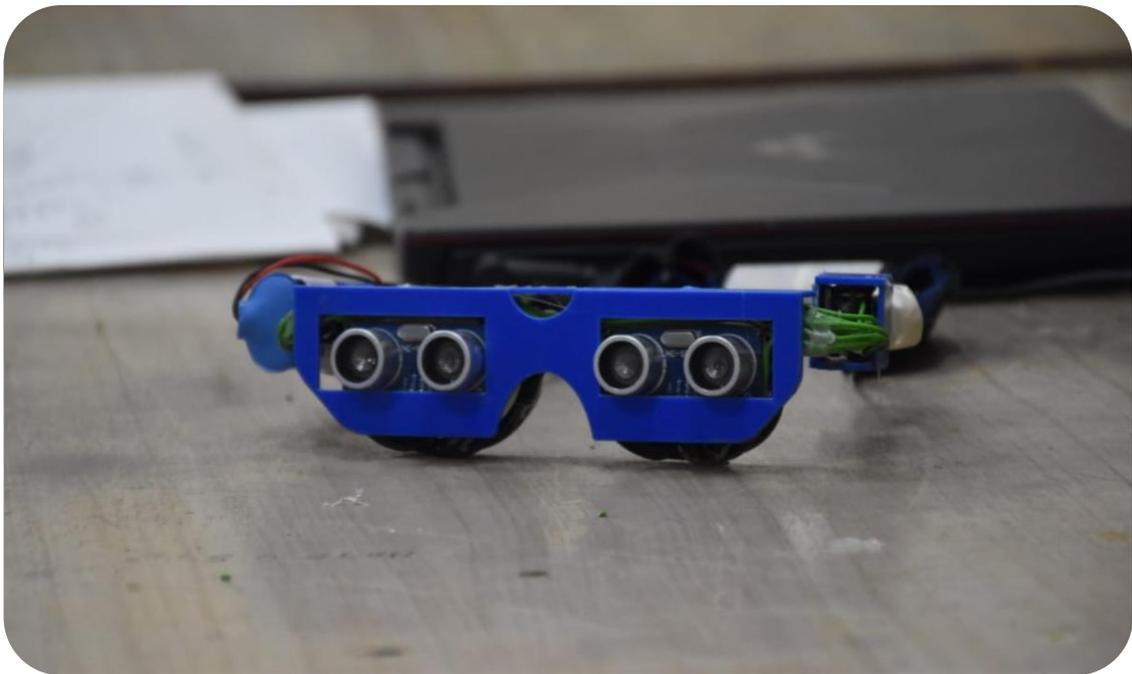
Working on their Innovative Idea



According to this Model of IOT Based IV Bag Monitoring and Alerting System, at first one has to set the fluid measurement at which we will get an alert from the system to start the process. When that set point is achieved then one will get a message that we will have to start the dripping of the blood or saline. This will reduce the danger from the patient.

This system can also be used as a Bubble Detector. This can also be used to measure the weight of the fluid.

3rd EYE FOR THE BLIND



Model of **3rd EYE FOR THE BLIND**





Sunglasses that serve an even more useful purpose than protecting the eyes of the blind.

Third Eye in the form of Sunglasses is an innovation which helps the blind people to navigate with speed and confidence by detecting the nearby obstacles using the help of ultrasonic waves and notify them with buzzer sound or vibration. It will make the blind people easy to navigate anywhere.

OLD MEMORIES











INSPIRE 2022

DEPARTMENT OF AEIE