

ELECTRA

The Yearly E-Magazine of Electrical Engineering Department 2021 – 2022 (Volume - 1, Issue - 1)

E OF TH

GYAN GANGA INSTITUTE OF TECHNOLOGY AND SCIENCES, JABALPUR

Near Bargi Hills, Tiwara Road, Jabalpur Contact No.: 0761-2671551 / 80 / 72 Website: www.ggits.org



The Yearly E-Magazine of Electrical Engineering Department 2021 – 2022 (Volume - 1, Issue - 1)

ais

Advisory Board:

Shri. Vishesh Jain, Executive Director, Academics Dr. Ravindra V. Kshirsagar, Principal Shri Sudeepto Mukherjee, Registrar

Chief Editor:-

Dr. Ruchi Pandey, Head Electrical Engineering

Board of Editor(s):-

Prof. Poonam Sarawgi (Faculty, EED) Prof. Vaishnavi Yadao (Faculty, EED) Prof. Avinash Sharma (Faculty, EED)

Student Editor(s):-

Ms. Yashika Sharma Mr. Nikhil Jaiswal Mr. Sagar Pandit Ms. Shivani Swami



The Yearly E-Magazine of Electrical Engineering Department 2021 – 2022 (Volume - 1, Issue - 1)

als

ABOUT THE DEPARTMENT

Department of Electrical Engineering (EE) is established in the year 2003 with the intake of 60 students to meet the requirements of Electrical Engineers for power sector, power sector industries, productions industries (PSU/Private) and R & D activities of Electrical Engineering after the consultation with stakeholders of the institute. Excellent infrastructure and lab equipment are provided for the students, so that our students come out with knowledge of latest cutting edge technology in both software and hardware. The Electrical engineering department has been accredited with excellence by National Board of Accreditation (NBA), New Delhi till 30th June, 2021.

VISION OF THE DEPARTMENT

- To produce Electrical Engineering graduates with sound technical knowledge and with ethical values who could excel in Electrical Systems.
- > To apprise students of state of art technology and industrial engineering applications.
- > To make Electrical Department as a centre of excellence.
- > To encourage industrial activities in department with faculty and student participation.

MISSION OF THE DEPARTMENT

- To Impart intensive and innovative teaching and training through latest technology to provide cutting-edge for achieving excellence.
- > To award practical projects aiming at solutions to practical industrial problems.
- To motivate faculty and technical assistants for updating / upgrading knowledge through training, seminars, workshops, conferences and higher studies.
- To create accredited / certified center for testing of transformers and other electrical equipment to cater to the needs of power sector / industries.
- Impart knowledge / solutions of social challenges, ethics, echo / environment etc. to produce worthy citizens.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs):

PEO 1 - Graduates will enter careers in the MNCs, PSUs, Private sector companies, etc. in the field of design, application, installation, manufacturing, operation & maintenance of electrical systems.

PEO 2 - Graduates will be undertaking higher studies. Graduate will analyze real life problems, will design techno-commercially feasible solutions to social problems.

PEO 3 - Graduates will be entrepreneurs, and will produce intellectual citizen to constitute an elegant society to meet social challenges with ethical & moral values having concern for the echo and environment.

PROGRAM SPECIFIC OUTCOMES (PSOs):

On successful completion of Electrical Engineering program, the graduate Engineers will be able to

PSO1: Apply principles of engineering, sciences, mathematics and laboratory skills for designing and developing solutions to problems of applications in the field of Electrical power and Energy systems.

PSO2: Engage in independent and life long learning in the technological advancements with the usage of modern design tools to analyze and design variety of complex applications in the field of Electrical Engineering.

PSO3: Communicate effectively with good leadership and managerial skills to work in a team or as team leader for techno commercially viable sustainable development of society, exhibiting core professional ethics.



The Yearly E-Magazine of Electrical Engineering Department 2021 – 2022 (Volume - 1, Issue - 1)



FROM THE CHAIRMAN'S DESK



I am elated at the publication of college magazine for the academic year 2021-22. I sincerely hope that the magazine proves to be an enjoyable and useful apparatus in the hands of both students and teachers of the college. I am also confident that it will serve as a source of inspiration for the teachers as well as the students to contribute articles regularly to the magazine in future. I whole-heartedly congratulate the HOD, Editors and the committee members on their successful endeavor to bring out the magazine.

> Dr. Rajneet Jain Chairman, Gyan Ganga Group



The Yearly E-Magazine of Electrical Engineering Department 2021 – 2022 (Volume - 1, Issue - 1)



FROM THE PRINCIPAL'S DESK



It takes me great honour in congratulating the students who have contributed for the current year's Tech Advisor magazine Acknowledging the fact that the magazine is completely created and designed by the students, I really hope this would kindle a spark in the minds of the students who are yet to contribute towards the progress of The Electric initiative in the upcoming years.

> Dr. Ravindra V. Kshirsagar Principal, GGITS, Jabalpur



The Yearly E-Magazine of Electrical Engineering Department 2021 – 2022 (Volume - 1, Issue - 1)

FROM THE HOD'S DESK

AÎ

I am very much happy that our department have taken steps to publish the quarterly emagazine "ELECTRA". I hope it will create enthuse among students and staffs in future. ELECTRA is a communication link between faculty members and students within and outside the department. It reports about development and areas of thrust in the field of Electrical Engineering. ELECTRA tries to bridge the gap between academic and actual mode of working in the industry by providing articles on various topics of industry. At the same time magazine also serve as a knowledge booster and helping hand to our students. We also make aware our students with the general issues related to environment, ecology, economy and rest of the society. It also helps to bring

> Dr. Ruchi Pandey Head of Department Electrical Engineering GGITS, Jabalpur

10



The Yearly E-Magazine of Electrical Engineering Department 2021 – 2022 (Volume - 1, Issue - 1)

FROM THE EDITOR'S DESK

The Creative minds of the Electrical Engineering Department of Gyan Ganga Institute of Technology and Sciences have come together to present what they have always wanted to and we congratulate every student who has given their contribution. They can't be appreciated enough and we can't explain how difficult it was to compile all their accomplishments into a single magazine. We take pride in showing you of how our very own GGITians have imaginations which spread across the horizons. We would like to thank the Management and all the staffs who have supported the 'ELECTRA' initiative and for having trust in the Editorial board by giving us full freedom to choose the contents and design for out magazine. The magazine should serve as a pillar of motivation for every other student who is yet to emerge as an Achiever and to carry the legacy of ELECTRA. The students who follow in the next academic years, we advise you to do the same. Go Mad, Be Productive but at the same time Be Creative!

SCIENTIST OF THE QUARTER

Georg Simon Ohm, more commonly known as Georg Ohm, was a German physicist, best known for his "Ohm's Law", which implies that the current flow through a conductor is directly proportional to the potential difference (voltage) and inversely proportional to the resistance. The physical unit of electrical resistance, the Ohm, also was named after him.



GEORG OHM

Born in 1789 in the university town of Erlangen, Bavaria, his younger Martin Ohm also became a famous mathematician. Georg Ohm studied mathematics and physics at Erlangen University. For economical reasons, he had to do some teaching jobs while studying, which he found quite bothering.

When higher degrees of political instability were observed in the early 1800s were seen in Bavaria as the struggle against Napoleon rose, Ohm chose to leave native Bavaria in 1817 for Cologne, where he attained a Readership at the university. Ohm started passionately working on the conductivity of metals and the behavior of electrical circuits. So much that he quit teaching in Cologne and got settled in his brother's house in Berlin.

After extensive research, he wrote "Die galvanische Kette, mathematisch bearbeitet", which formulated the relationship between voltage (potential), current and resistance in an electrical circuit: EIR

After initial criticism, most particularly by Hegel, the noted creator of German Idealism, who rejected the authenticity of the experimental approach of Ohm, the "glory" finally came in 1841 when the Royal Society of London honored him with the Copley Medal for his extraordinary efforts. Several

12

German scholars, including an adviser to the State on the development of telegraphy, also recognized Ohm's work a few months later.

The pertinence of Ohm's Law to electrolytes and thermoelectric junctions and metallic conductors, was demonstrated recognized soon enough. The law still remains the most widely used and appreciated of all the rules related to the behavior of electrical circuits.

Georg Ohm was made a foreign member of the Royal Society in 1842, and a full member of the Bavarian Academy of Sciences and Humanities in 1845.

Ohm died on July 6, 1854. He was 65 years old.

FACULTY ARTICLES

CLOAKING

Inspired perhaps by Harry Potter's invisibility cloak, scientists have recently developed several ways-some simple and some involving new technologies-to hide objects from view. The latest effort, developed at the University of Rochester, not only overcomes some of the limitations of previous devices, but it uses inexpensive, readily available materials in a novel configuration.

"There've been many high tech approaches to cloaking and the basic idea behind these is to take light and have it pass around something as if it isn't there, often using high-tech or exotic materials," said John Howell, a professor of physics at the University of Rochester. Forgoing the specialized components, Howell and graduate student Joseph Choi developed a combination of four standard lenses that keeps the object hidden as the viewer moves up to several degrees away from the optimal viewing position.

"This is the first device that we know of that can do three-dimensional, continuously multidirectional cloaking, which works for transmitting rays in the visible spectrum," said Choi, a PhD student at Rochester's Institute of Optics.

Many cloaking designs work fine when you look at an object straight on, but if you move your viewpoint even a little, the object becomes visible, explains Howell. Choi added that previous cloaking devices can also cause the background to shift drastically, making it obvious that the cloaking device is present.



In order to both cloak an object and leave the background undisturbed, the researchers determined the lens type and power needed, as well as the precise distance to separate the four lenses. To test their device, they placed the cloaked object in front of a grid background. As they looked through the lenses and changed their viewing angle by moving from side to side, the grid shifted

Department of Electrical Engineering

13

accordingly as if the cloaking device was not there. There was no discontinuity in the grid lines behind the cloaked object, compared to the background, and the grid sizes (magnification) matched.

The Rochester Cloak can be scaled up as large as the size of the lenses, allowing fairly large objects to be cloaked. And, unlike some other devices, it's broadband so it works for the whole visible spectrum of light, rather than only for specific frequencies.

Their simple configuration improves on other cloaking devices, but it's not perfect. "This cloak bends light and sends it through the center of the device, so the on-axis region cannot be blocked or cloaked," said Choi. This means that the cloaked region is shaped like a doughnut. He added that they have slightly more complicated designs that solve the problem. Also, the cloak has edge effects, but these can be reduced when sufficiently large lenses are used.

Prof. Vaishnavi Yadao

Asst. Prof. Electrical Engg. Dept.

GGITS, Jabalpur

14

REAL-TIME HOLOGRAPHIC DISPLAYS

Real-time dynamic holographic displays, long the realm of science fiction, could be one step closer to reality, after researchers from the Univ. of Cambridge developed a new type of pixel element that enables far greater control over displays at the level of individual pixels. The results are published in Physica Status Solidi.

A relatively large area exists in which additional functionality can be added through the patterning of nanostructures (optical antennas) to increase the capacity of pixels in order to make them suitable for holographic displays.



As opposed to a photograph, a hologram is created when light bounces off a sheet of material with grooves in just the right places to project an image away from the surface. When looking at a hologram from within this artificially generated light field, the viewer gets the same visual impression as if the object was directly in front of them.

Currently, the development of holographic displays is limited by technology that can allow control of all the properties of light at the level of individual pixels. A hologram encodes a large amount of optical information, and a dynamic representation of a holographic image requires vast amounts of information to be modulated on a display device.

Prof. Anand Goswami

Asst. Prof. Electrical Engg. Dept.

GGITS, Jabalpur

15

RELIABILITY & DEREGULATION

The natural monopoly of the transmission and distribution network operators has created a well founded concern that the reliability of the power supply will decrease in future. To prevent this, a certain amount of regulation is unavoidable. A regulatory body needs to collect and publish performance indicators of all transmission and distribution companies. The regulatory body also needs to set standards for the reliability performance, including a penalty system. Possible options are the payment of compensation to customers and a control of the distribution and transmission charges depending on the reliability performance. The techniques for the data collection and the calculation of performance indicators are well developed and can directly be used.

The risk of a serious blackout requires a somewhat different approach. The consequences of such an event are so large that it is not appropriate to wait for the collection of sufficiently confident statistics. Some kind of stochastic prediction of the risk of a blackout needs to be applied to the system. When this risk becomes unacceptably high, the regulatory body should intervene. In many deregulated markets, this task lays with the operator of the transmission grid.

Unfortunately, implementation of the task is not very transparent. The main problems are expected at transmission level. Various markets mechanisms may also be used to

A STATE AND A STATE OF A STATE

prevent too much reduction in supply reliability, especially to prevent shortages in generation capacity and in transport capacity in the transmission network.

New reliability analysis tools need to be developed to include the uncertainties of the market in reliability planning tools, and to enable the application of reliability techniques at the system operational level.

Prof. Shalini Vaishya

Asst. Prof. Electrical Engg. Dept.

GGITS, Jabalpur

16

MODELLING OF PV CELLS & ITS IMPACT ON GRID

Generation of solar energy has tremendous scope in India. The geographical location of the country stands to its benefit for generating solar energy. The reason being India is a tropical country & it receives solar radiation almost throughout the year, which amounts to 3000 hours of sunshine. This is equal to more than 5,000 trillion KWh. Almost, all parts of India receive 4-7 kwh of solar radiation per sq meters .This is equivalent to 2300 -3200 sunshine hours per year. Electricity demand,, a rising interest in clean technologies, saturation of oil resources and energy security are reasons for demand for renewable energy generation systems which is rising every year.

Among all the renewable energy sources the use of solar energy is increasing rapidly due to its availability & advancement in Photovoltaic technology. But integration of PV technology to utility grid is a critical process. In this present scenario current controlled pulse width modulated voltage source inverter is widely used.

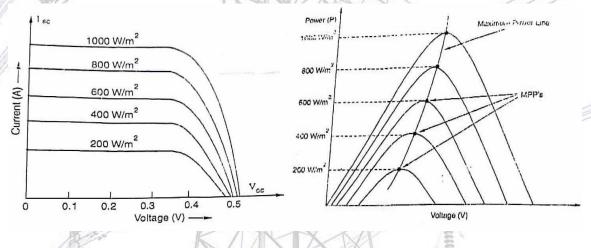
SOLAR PV MODULE: Photovoltaic modules are composed of many PV cells connected in series (usually 36 no's) (Ethyl vinyl acetate) An insulating tidlar sheet is placed beneath PV modules are thin silicon wafers sealed between a layer of toughed glass & layers of EVA (Ethyl Vinyl Acetate). An insulating tidlar sheet is placed beneath layers for further protection. PV systems are generally classified as grid connected and stand- alone systems.

Grid- connected PV systems operate in parallel with & interconnected with the electric utility Grid. The primary component is inverter PCU(Power conditioning unit). PCU which converts DC power by PV array in to AC power in consistency with voltage & power quality requirement of utility Grid .A bi-directional interface is made between PV

system AC O/P circuits & electric Utility network. Stand-Alone PV systems operate independently and are designed to supply certain DC or AC electrical loads. These systems are powered by PV array only.

The V-I characteristics of a PV module as shown in figure is a non-linear graph between current and voltage generated by a PV module (Maximum Power Points) are shown to represent the point at which power drawn from a PV module is maximum . MPL represent the track or path tracked by maximum power point tracking (MPPT).

The P-V Characteristics of a PV module as shown in fig .2 is a non linear graph plotted between power & voltage of a PV module, for different densities W/m₂,different graphs are plotted.



V-I Characteristic of PV Module

P-V Characteristic of PV Module

Designing PV cells with some electrical appliances like DC-DC boosters are very useful in boosting up the voltage where ever it is necessary & also for suppressing the ripples, etc. DC-DC choppers with variable duty cycle can be used along with filters.

Prof. Poonam Sarawgi

Asst. Prof. Electrical Engg. Dept.

GGITS, Jabalpur

17

STUDENTS ARTICLES

PEN PC TECHNOLOGY

P-ISM - Pen-style Personal Networking Gadget Package. This 'pen sort of instruments' produces both the soft-output as well as the Virtual keyboard on any flat surfaces from where you can carry out functions you would normally do on your desktop computer. It is based on Electronic perception technology. P-ISM's are connected with one another through short-range wireless technology. The whole set is also connected to the Internet through the cellular phone function.

Electronic Perception Technology (EPT) is a low-cost, single-chip imagining technology. One of the first applications is a "virtual keyboard". EPT systems can accurately determine brightness and distinguish objects from one another. Current EPT keyboards can sense up to 400 characters per minute. P-ISM package including five gadgets-CPU Pen, Camera Pen, Virtual Keyboard, Projector Pen, Communication Pen.



Advantages of P-ISM are Portable, Feasible, Wi-Fi technology based on Electronic Perception Technology. Disadvantages of P-ISM are Positioning is more important to use it to up to optimum level, keyboard concept is not new, currently unclear, gadget is very costly. The communication devices are becoming smaller and compact. This is only an example for the start of this new technology. We can expect more such developments in the future.

Ms. Rishita Pawar

18

PAPER BATTERY

A paper battery is an electric battery engineered to use a spacer formed largely of cellulose. It incorporates nanoscale structures to act as high surface-area electrodes to improve conductivity. In addition to being unusually thin, paper batteries are flexible and environmentally-friendly, allowing integration into a wide range of products. Their functioning is similar to conventional chemical batteries with the important difference that they are non-corrosive and do not require extensive housing.



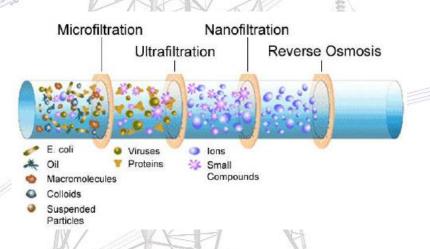
Paper batteries were described by a researcher as "a way to power a small device such as a pacemaker without introducing any harsh chemicals-such as the kind that are typically found in batteries-into the body. "Their ability to use electrolytes in the blood make them potentially useful for medical devices such as pacemakers, medical diagnostic equipment, and drug delivery transdermal patches. German healthcare company KSW Microtech is using the material to power blood supply temperature monitoring. Paper battery technology can be used in super capacitors. The batteries employ nanotubes, potentially slowing commercial adoption due to excessive cost. Commercial adoption also requires larger devices. E.g., a newspaper-sized device could be powerful enough to power a car.

Mr. Nikhil Jaiswal

19

NANOFILTERATION

Environmental scientists and engineers are creating nanomembranes to filter contaminants from water cheaply and effectively. There are simple and cheap ways to filter contaminants out of water. Pouring water through sand, gravel, or charcoal are simple and inexpensive methods of cleaning water. Sand, gravel, and charcoal don't filter out some contaminants, like bacteria, viruses, industrial pollutants, agricultural pollutants, salt. A membrane is a thin material that has pores (holes) of a specific size. Membranes trap larger particles that won't fit through the pores of the membrane, letting water and other smaller substances through to the other side. There are four general categories of membrane filtration systems Microfiltration, Ultrafiltration, Nanofiltration, Reverse Osmosis . In microfiltration typical pore size: 0.1 microns (10-7m), Very low pressure, removes bacteria, some large viruses, does not filter small viruses, protein molecules, sugar, and salts. In ultrafiltration typical pore size: 0.01 microns (10-8m), moderately low pressure, removes viruses, protein, and other organic molecules, does not filter ionic particles like lead, iron, chloride ions; nitrates, nitrites; other charged particles. In nanofiltration typical pore size: 0.001 micron (10-9m), moderate pressure, removes toxic or unwanted bivalent ions (ions with 2 or more charges), such as lead, Iron, Nickel, Mercury (II). Filters can be sequenced from large to small pore size to decrease fouling. They must still be cleaned regularly to remain usable.



At the nanoscale, filters can be constructed to have properties designed to serve a particular purpose. Scientists and engineers are now experimenting to create membranes that are low-cost yet very effective for filtering water to make it drinkable. These inventions may help to solve the global water shortage.

Mr. Sudhanshu Sharma

20

One week Workshop on "**Programming in C++**" was organized by the Department under professional society IIES for IV Semester Students of the Department from 17-01-2022 to 22-01-2022 through **Online Mode.** Every student of IV semester in the Department has participated and got certificate after completion of the Workshop.

One week Workshop on "**Python Programming**" was organized by the Department under professional society IIES for VI Semester Students of the Department from 27-01-2022 To 03-02-2022 through **Online Mode.** Every student of VI semester in the Department has participated and got certificate after completion of the Workshop.

Department has applied for the NBA Accreditation in the month of May 2022.

Two Projects shortlisted for MSME Idea Hackathon 2022 from Electrical Engineering Department.

1. Ventilated Personal Protective Equipment (VPPE) Team Member: Mohammad Asad Mansoori (VIII Sem)

2. Smart Helmet

Team Members:

Akshat Kesharwani (VI Sem) Anuj Patel (VI Sem) Nikhil Jaiswal (VI Sem) Rishita Pawar (VI Sem)

22

"Hands on Workshop" on "Arduino Programming and IOT Application" Conducted in the Department by Eagle Foundation for V Semester Students.



A guest lecture was delivered by **Dr. Subhojit Sidhanta** from **IIT, Bhilai. Topic:** Leveraging distributed machine learning for IoT Related Problems in Electrical Engineering: A Drone Perspective. **Date:** 24 / 06 /2022 **Venue:** Seminar Hall (Room No. 010)



23

Industrial visit of "220 KV SUBSTATION NAYAGAON, JABALPUR" for 4th Semester students of the Department.

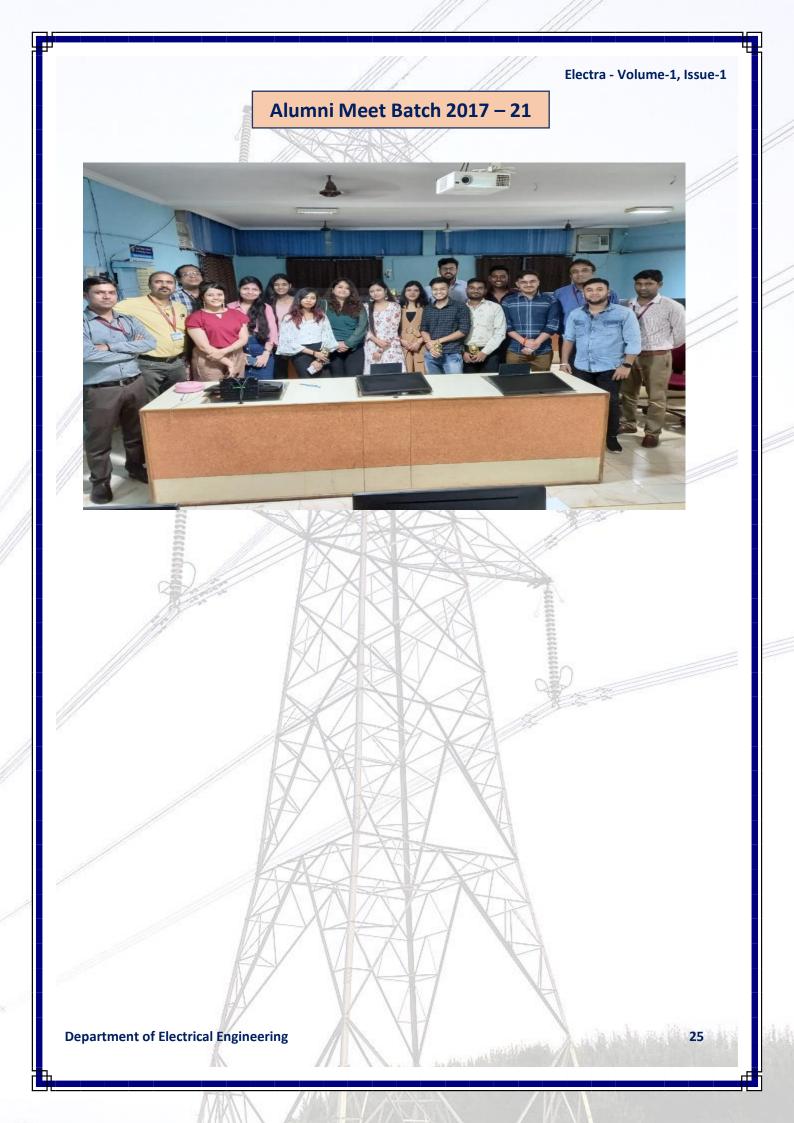
Date: 26 / 03 / 2022



Sports Activities on 18th June 2022 "Open Day Celebration"









Top Placements

Department of Electrical Engineering Batch 2018 - 22

Devnet Associate, Linux, Python, C,

Bombay, Technical Training by Dept.,

C++, Microsoft, IBM, AWS cloud

certification, spoken tutorial IIT

yashikasharma718@gmail.com/

Devnet Associate, Linux, Python, C,

C++, Microsoft, IBM, AWS cloud

certification, spoken tutorial IIT

Ramchouksey2000@gmail.com

Cisco Networking Academy-CCNA,

Devnet Associate, Linux, Python, C,

C++, Microsoft, IBM, AWS cloud

certification, spoken tutorial IIT

NPTEL Lecture

9993663730

Bombay

8305448540

CONGRATULATIONS





Mahima Choudhary

Cognizant CONSULTANCY 4 LAC PER ANNUM 3.36 LAC PER ANNUM



E-mail ID & Contact No.

AND A PARTY AND

Bombay

mahimachoudhary0008@gmail.com

26



| T |
|--|
| Electra - Volume-1, Issue-1 |
| Training/Certifications Done |
| Cisco Networking Academy-CCNA, |
| Devilet Associate, Linux, Fytholi, C, |
| C++, Microsoft, IBM, AWS cloud |
| certification, spoken tutorial IIT Bombay |
| |
| E-mail ID & Contact No. |
| nikitakori2024@gmail.com, 6264908977 |
| Training/Certifications Done |
| Cisco Networking Academy-CCNA, |
| Devnet Associate, Linux, Python, C, |
| C++, Microsoft, IBM, AWS cloud |
| certification, spoken tutorial IIT |
| Bombay |
| Contact No. 7440523278 |
| Training/Certifications Done |
| Python, C, C++, Microsoft, spoken tutorial |
| IIT Bombay, Technical Training by |
| Dept., NPTEL Lecture, MATLAB, |
| SCADA, PLC, MI-Power |
| E-mail ID & Contact No. |
| mayank.pyasi.ee17@ggits.net |
| 7509940182 |
| Training/Certifications Done |
| Cisco Networking Academy-CCNA, |
| Devnet Associate, Linux, Python, C, |
| C++, Microsoft, IBM, AWS cloud |
| certification, spoken tutorial IIT |
| Bombay |
| E-mail ID & Contact No. 9407339292 |
| |
| |
| |
| |
| 28 |
| Y LOUISING PROVIDENT |
| |

Electra - Volume-1, Issue-1 **Training/Certifications Done** Capgenini Cisco Networking Academy-CCNA, Devnet Associate, Linux, Python, C, **4 LAC PER ANNUM** C++, Microsoft, IBM, AWS cloud certification, spoken tutorial IIT Keerti Choudari Bombay E-mail ID & Contact No. 9300245936 **Training/Certifications Done** Cognizant Python, C, C++, Microsoft, spoken tutorial IIT Bombay, Technical Training by Dept., NPTEL Lecture, MATLAB, 4.5 LAC PER ANNUM SCADA, PLC, MI-Power uryan Shrivastava E-mail ID & Contact No. suryanrishu@gmail.com / 7024781333 TATA CONSULTANCY **Training/Certifications Done** SERVICES Python, C, C++, Microsoft, spoken tutorial **3.36 LAC PER ANNUM** IIT Bombay, Technical Training by Dept., NPTEL Lecture, MATLAB, SCADA, PLC, MI-Power Aditya Sharma E-mail ID & Contact No. aditya1990.580@rediffmail.com, 7697274193 ERICSSON GLOBAL **Training/Certifications Done** 4.5 LAC PER ANNUM Cisco Networking Academy-CCNA, Devnet Associate, Linux, Python, C, C++, Microsoft, IBM, AWS cloud Anjali Dewangan certification, spoken tutorial IIT Bombay E-mail ID & Contact No. anjalidewangan2001@gmail.com 6265293347

