

INSPIREEE

**INSPIRATIONAL SCRIPTS,
PERSONALITIES AND INNOVATIVE
RESEARCH OF EEE**

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Pottapalayam -630612, Sivagangai District, Tamilnadu

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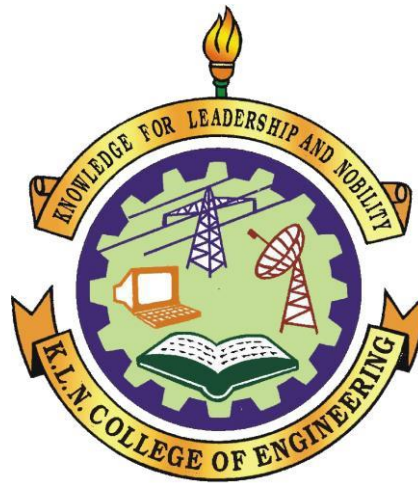
INSpirational Scripts, Personalities and Innovative Research of EEE

VISION

To become a high standard of excellence in Education, Training and Research in the field of Electrical and Electronics Engineering and allied applications

MISSION

To Produce excellent, innovative and Nationalistic Engineers with Ethical values and to advance in the field of Electrical and Electronics Engineering and Allied Areas



K.L.N. College of Engineering

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MESSAGE FROM HEAD OF THE DEPARTMENT

In this issue articles on the most recent topics presented by the student Electrical vehicles are desired of the future economic of our country. A Briefly note on this presented opportunity are very high on this field.



Some of the articles guide lines for technical paper written in presentation. Once work will be appreciated only when it is presented well. As the paper will be presented in the National/International forum, special care should be taking before publishing in the articles. The recent fire accident hospitals and temples required more precaution measure to be taken to safe guards. Our loved only and properties and document protected for long period of time. Examination reforms and challenges will definitely improve the confidence of the student.

Best Wishes

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BEST TRANSFORMER PROTECTION

R.M.KARTHICK 182006 II YEAR /EEE / III Sem

INTRODUCTION

This technical relies on the previously published article (6 alarms coming from a substation transformer you MUST take very seriously), but is much more dedicated to the implementation of relay protection principles. You know that transformer is one of the most important links in a transmission system.

Unfortunately, its great range of characteristics and special features makes complete protection difficult.

Practical implementation of the six most common transformer protection principles

The choice of suitable protection for transformers also is governed by cost, as the ratings required in transmission, and distribution systems, range from a few kVA to several hundred MVA.

Fuses are used for the lower rated transformers. Higher ratings, however, require the best protection that can be designed.

The most common principles adopted in transformer protection include the following:

1. Overheating protection
2. Overcurrent protection
3. Earth fault protection (restricted and standby)
4. Biased differential protection
5. Gas detection protection, and
6. Over fluxing protection

1. Overheating Protection

The rating of a transformer is based on the **temperature rise above an assumed maximum air temperature**. An oil temperature of about **95°C** is considered to be the maximum working value beyond which a further rise of 8-10°C will have a detrimental effect on the transformers

insulation. It will lower the life of a transformer, if sustained.

1. Large transformers have oil and/or winding temperature detection devices. Both **direct (oil) and indirect (winding) methods** of temperature measurement may be employed, or a combination of both.

2. Earth Fault (Restricted)

1. Generally, the simple overcurrent and earth fault scheme used in a typical line protection application does not give adequate protection to a star connected winding.
2. The degree of protection is greatly improved by the application of a **unit differential earth fault scheme (or restricted earth fault protection)**. This is shown in Figure 2. This diagram shows a high impedance relay
3. The protection system is operative for faults within the zone of the current transformers. Virtually complete cover for earth faults is obtained, particularly when the star point is solidly earthed

3. Overcurrent Protection

Protection against excess current was the earliest evolved protection system. From this basic principle, the **graded overcurrent system** was introduced for fault protection. Most system disturbances utilizing this method are detected with IDMT relays, that is, relays having:

1. **Inverse characteristic** (the larger the fault current, the quicker is the operation), and
2. **Definite minimum time of operation**.
The degree of overcurrent protection provided to a transformer by an IDMT relay is limited. Usually, settings of these relays must be high, that is, **150%**

to 200%. This is because the relays must not operate for emergency overload conditions.

4. Gas Detection

Faults inside oil immersed electrical plant (for example, transformers) cause gas to be generated. If the fault is severe, oil movement occurs.

The generation of gas is used as a means of **fault detection in the gas/oil operated relay**. This comprises one or two hinged vanes, buckets, or similar buoyant masses inserted into the pipework between the oil conservator and the transformer tank.

5. Overfluxing

Transformer overfluxing is caused by **overvoltage and/or a reduction in system frequency**. Overvoltage causes an increase in the flux generated and stress on insulation. The increased flux density causes an increase in iron loss and an increase in magnetising current.

Flux is diverted from the laminated core of the transformer into the steel structure. This gives rise, particularly, to the core bolts carrying more flux than their designed limits. Under these conditions, the core bolts may be rapidly heated to a temperature which destroys the insulation surrounding them.

6. Differential Protection

Differential protection is designed to cover the complete transformer. This is possible because of the high efficiency of transformer operation and the nearly equal ampere turns developed in the primary and secondary windings. (MVA 'in' approximately equals MVA 'out').

This type of protection scheme **compares current quantities flowing into the network with quantities flowing out of the network**. The difference between these values is referred to as the 'spill' current available for operation of the protection relay.

7. Magnetising Current Inrush

When a transformer is energized initially, magnetising current is required. The current appears **only on the primary side of the transformer**, therefore, the whole of the magnetizing current appears as an imbalance to the differential protection.

Since this phenomenon is only transient, **stability of protection may be maintained by the use of a second harmonic restraint**, being the most widely used to prevent the operation of magnetizing inrush current. This is because the waveform produced by inrush currents has a significant amount of second harmonics.

"Analysis of a gas sample collected in a Buchholz chamber frequently may assist diagnosis of the type of fault. The rate of gas generation indicates the severity of the fault."

♣ Cost of repairing damage

♣ Cost of lost production

♣ Adverse effects on the balance of the system ♣ The spread of damage to adjacent equipment ♣ The period of unavailability of the damaged equipment

8. Overexcitation

♣ Most relays block the differential element from functioning during transformer overexcitation • If the transformer internally faults (1 or 2 Phase), the unfaulted phase(s) remain overexcited blocking the differential element • Faulting during overexcitation is more likely if the voltage is greater than rated, as it will cause increased dielectric stress

♣ An improved strategy is to raise the pick up level of the differential element to accommodate the increased difference currents caused by the transformer saturation • This allows the differential element to rapidly trip if an internal fault occurs during the over excitation period

♣ Result: Improved reliability while not sacrificing security

INTERGRATED CIRCUITS

P.Vaisnavananthini-182001 EEE – II Years / III Sem

An **integrated circuit** or **monolithic integrated circuit** (also referred to as an **IC**, a **chip**, or a **microchip**) is a set of electronic circuits on one small flat piece (or "chip") of semiconductor material that is normally silicon. The integration of large numbers of tiny transistors into a small chip results in circuits that are orders of magnitude smaller, faster, and less expensive than those constructed of discrete electronic components. The IC's mass production capability, reliability, and building-block approach to circuit design has ensured the rapid adoption of standardized ICs in place of designs using discrete transistors. ICs are now used in virtually all electronic equipment and have revolutionized the world of electronics. Computers, mobile phones, and other digital home appliances are now inextricable parts of the structure of modern societies, made possible by the small size and low cost of ICs.

Integrated circuits were made practical by mid-20th-century technology advancements in semiconductor device fabrication. Since their origins in the 1960s, the size, speed, and capacity of chips have progressed enormously, driven by technical advances that fit more and more transistors

on chips of the same size – a modern chip may have many billions of transistors in an area the size of a human fingernail. These advances, roughly following Moore's law, make computer chips of today possess millions of times the capacity and thousands of times the speed of the computer chips of the early 1970s.

ICs have two main advantages over discrete circuits: cost and performance. Cost is low because the chips, with all their components, are printed as a unit by photolithography rather than being constructed one transistor at a time. Furthermore, packaged ICs use much less material than discrete circuits. Performance is high because the IC's components switch quickly and consume comparatively little power because of their small size and close proximity. The main disadvantage of ICs is the high cost to design them and fabricate the required photomasks. This high initial cost means ICs are only practical when high production volumes are anticipated.

Integrated circuits can be classified into analog, digital and mixed signal, consisting of both analog and digital signaling on the same IC. Analog ICs, such

as sensors, power management circuits, and operational amplifiers (op-amps), work by processing continuous signals. They perform analog functions such as amplification, active filtering, demodulation, and mixing.

Analog ICs ease the burden on circuit designers by having expertly designed analog circuits available instead of designing and/or constructing a difficult analog circuit from scratch.

IC can also combine analog and digital circuits on a single chip to create functions such as analog-to-digital converters and digital-to-analog converters. Such mixed-signal circuits offer smaller size and lower cost, but must carefully account for signal interference

Digital integrated circuits can contain anywhere from one to billions of

logic gates, flip-flops, multiplexers, and other circuits in a few square millimeters. The small size of these circuits allows high speed, low power dissipation, and reduced manufacturing cost compared with board-level integration. These digital ICs, typically microprocessors, DSPs, and microcontrollers, work using boolean algebra to process "one" and "zero" signals.

Among the most advanced integrated circuits are the microprocessors or "**cores**", which control everything from personal computers and cellular phones to digital microwave ovens. Digital memory chips and application-specific integrated circuits (ASICs) are examples of other families of integrated circuits that are important to the modern information society

WHAT IS DIGITAL INDIA?

J. EVANGELINE PRINCY 172001 III YEAR EEE-A

What is Digital India?

Digital India is a Programme to prepare India for a knowledge future. Honourable Shri Narendra Modi, Prime Minister of India has laid emphasis on National e- governance plan and has gave it is approval for Digital India – A programme to transform India into digital empowered society and knowledge economy.

Digital India is an ambitious programme of Government of India projected at Rs 1, 13,000 crores. This will be for preparing the India for the knowledge based transformation and delivering good governance to citizens by synchronized and co-ordinated engagement with both Central Government and State Government.

This programme has been envisaged by Department of Electronics and Information Technology (Deity) and will impact ministry of communications & IT, ministry of rural development, ministry of human resource development, ministry of health and others. This programme will also benefit all states and union territories. The existing/ ongoing e-Governance initiatives would be revamped to align them with the principles of Digital India. The vision of Digital India is to transform the country into a digitally empowered society and knowledge economy. It would ensure that government

services are available to citizens electronically. It would also bring in public accountability through mandated delivery of government's services electronically.

The Digital India vision provides the intensified impetus for further momentum and progress for e-Governance and would promote inclusive growth that covers electronic services, products, devices, manufacturing and job opportunities. Digital infrastructure will focus on providing high speed secure Internet. Governance and services on demand will stress on integrating Services across departments and jurisdictions and making services available in real time for both online and mobile platform. Digital empowerment of citizens will pay emphasis on universal digital literacy and availability of digital resources/services in Indian languages.

The programme will be implemented in phases from 2014 till 2018. The source of funding for most of the e-Governance projects at present is through budgetary provisions of respective ministries/departments in the central or state governments. Requirements of funds for individual project(s) for Digital India will be worked out by respective nodal ministries/departments but according to government estimate it will cost Rs 113,000 crore. To implement this, the government is

planning to strengthen National Informatics Centre (NIC) by restructuring it to support all central government departments and state governments. Positions of chief information officers (CIO) would be created in at least 10 key ministries so that e-Governance projects could be designed, developed and implemented faster.

Apart from this, the Deity would create four senior positions within the department for managing the programme say additional secretary, Digital India; joint secretary, infrastructure development; joint secretary, capacity building and digital enablement; and joint secretary, IT applications in uncovered areas & process re-engineering.

Digital India has the VISION:

Infrastructure as a utility to every citizen:

High speed internet shall be made available in all gram panchayats; Cradle to grave digital identity; Mobile and Bank account would enable participation in digital and financial space at individual level; Easy access to common service centre within their locality; Shareable private space on a public cloud; and Safe and secure cyber space in the country.

Infrastructure as a utility to every citizen:

High speed internet shall be made available in all gram panchayats; Cradle to grave digital identity; Mobile and Bank account would enable participation in digital and financial space at individual level; Easy access to common service centre within their locality; Shareable private space on a public cloud; and Safe and secure cyber space in the country.

Governance and Services on Demand:

Single window access to all persons by seamlessly integrating departments or jurisdictions; availability of government services in online and mobile platforms; All citizen entitlements to be available on the Cloud to ensure easy access; Government services to be digitally transformed for improving ease of doing business; Making financial transactions above a threshold, electronic and cashless; and Leveraging GIS for decision support systems and development.

Digital empowerment of citizens:

Universal digital literacy; All digital resources universally accessible; All government documents/certificates to be available on the Cloud; Availability of digital resources/services in Indian languages; Collaborative digital platforms for participative governance; Portability of all entitlements for individuals through the cloud.

BJP Vision for Digital India:

BJP Election Manifesto 2014 aimed to nurture a Digital India thereby making every household and every individual digitally empowered.

The party aims to make every household digitally literate with a goal to make India the Global Knowledge hub, with IT being a major driver and engine of growth.

The manifesto has a strong focus on e-Governance as BJP believes IT is a great enabler for empowerment, equity and efficiency. The party is focusing on: broad

banding villages; participative governance; digital learning; tele-medicine and mobile healthcare; open source and open standard; E-Bhasha; and others.

OUR 9 PILLERS

Broadband Highways

Laying of national optical fibre network (NOFN) in all 2.5 lakhs gram panchayats in the country will happen in a phased manner.

Universal Access to Mobile connectivity

Ensuring mobile access in around 44,000 uncovered villages in the country and government is taking steps to ensure that all villages are covered through mobile connectivity by 2018.

Public Internet access

To expand the coverage of common services centre (CSC) from 1.35 lakhs to 1.5 lakhs, i.e. one in every panchayats.

E-Governance

Business process re-engineering will be undertaken to improve processes and service delivery. Services will be integrated with UIDAI, payment gateway and mobile platform.

E-Kranti

E-Kranti focuses on electronic delivery of services whether it is education, health, agriculture, justice and financial inclusion.

Global Information

The focus will be on online hosting of data and proactive engagement through social media and web based platforms like MyGov.

Electronics Manufacturing

Focus is on set top boxes, VSAT, mobile, consumer electronics, medical electronics, smart energy meters, smart cards and micro ATMs.

IT Training for Jobs

The government is planning to train one crore students from small towns and villages for IT sector.

Early Harvest Programmes

The government is planning to deploy Aadhaar Enabled Biometric Attendance System in all central government offices located at Delhi. A web based application software system will enable online recording of attendance and its viewing by the concerned stakeholders.

What is Smart City?

G.R. AKSHAYA 172307

III YEAR EEE- A

The first question is what is meant by a 'smart city'. The answer is, there is no universally accepted definition of a smart city. It means different things to different people. The conceptualization of Smart City, therefore, varies from city to city and country to country, depending on the level of development, willingness to change and reform, resources and aspirations of the city residents. A smart city would have a different connotation in India than, say, Europe. Even in India, there is no one way of defining a smart city.

Some definitional boundaries are required to guide cities in the Mission. In the imagination of any city dweller in India, the picture of a smart city contains a wish list of infrastructure and services that describes his or her level of aspiration. To provide for the aspirations and needs of the citizens, urban planners ideally aim at developing the entire urban eco-system, which is represented by the four pillars of comprehensive development-institutional, physical, social and economic infrastructure. This can be a long term goal and cities can work towards developing such comprehensive

infrastructure incrementally, adding on layers of 'smartness'.

In the approach of the Smart Cities Mission, the objective is to promote cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application of 'Smart' Solutions. The focus is on sustainable and inclusive development and the idea is to look at compact areas, create a **replicable model which will act like a light house to other aspiring cities**. The Smart Cities Mission of the Government is a bold, new initiative. It is meant to set examples that can be replicated both within and outside the Smart City, catalysing the creation of similar Smart Cities in various regions and parts of the country.

The core infrastructure elements in a smart city would include:

- i. adequate water supply,
- ii. assured electricity supply,
- iii. sanitation, including solid waste management,

- iv. efficient urban mobility and public transport,
- v. affordable housing, especially for the poor,
- vi. robust IT connectivity and digitalization,
- vii. good governance, especially e-Governance and citizen participation,
- viii. sustainable environment,
- ix. safety and security of citizens, particularly women, children and the elderly, and
- x. health and education.

As far as Smart Solutions are concerned, an illustrative list is given below. This is not, however, an exhaustive list, and cities are free to add more applications.



Accordingly, the purpose of the Smart Cities Mission is to drive economic growth and improve the quality of life of people by enabling local area development and harnessing technology, especially technology that leads to Smart outcomes. Area-based development will transform existing areas (retrofit and redevelop), including slums, into better planned ones, thereby improving live ability of the whole City. New areas (Greenfield) will be developed around cities in order to accommodate the expanding population in urban areas. Application of Smart Solutions will enable cities to use technology, information and data to improve infrastructure and services. Comprehensive development in this way will improve quality of life, create employment and enhance incomes for all, especially the poor and the disadvantaged, leading to inclusive Cities.

I AM ENGINEER AND SO PROUD TO BE....

C.GAYATHRI

Roll No: 172009

EEE – III Years / V Sem

I am an Engineer and so proud to be.

Here i would like to add some facts about engineering students which i personally realized and experienced during my engineering.

- For engineers every course apart from engineering is easy.
- An engineer learns to power of getting up at 9.25 am and reaching in the class at 9.30 am.
- T-shirt and jeans are engineers national dress and Maggie national food.
- A normal person will fix the broken things but an engineer will first break that thing and then he would fix it. This is his lab work you don't have any right to disturb him.
- An engineer can build a car, space ship and they even can make time machine. However they just can't build a relationship with a girl.
- An engineer loves to solve a problem. If there is no problem then they will create one and would start solving it..
- An engineer can have Dr. Title but a doctor can't have Er. Title.
- An engineer can derive any relation just give them the final expression.
- Are you made of copper(CU) and tellurium(TE), because you're CUTE. This is how Engineers flirt.
- Non engineers have great mind, genius mind, brilliant mind but an engineer never mind.
- An engineer's worst nightmare is teacher taking the class but not taking attendance.
- An engineer can finish his syllabus in one night.
- An Engineer knows nothing, but only an Engineer knows this.
- An Engineer will never sleep in night and will never wake up in morning.
- An Engineer is the most innocent person in front of his parents.
- Never argue with an engineer because arguing with Engineers is like killing the mosquito on your cheek, you might or might not kill it, but you'll end up slapping yourself.
- No one can speak better English than an engineer who is having a bottle of beer in his hand. (Note- I am not a drunker but this is i had seen around me)

BY

C.GAYATHRI

EEE -172009

GUIDELINES FOR WRITING A RESEARCH PAPER FOR PUBLICATION

B. ALAGU PADMANATHAN

172027

III YEAR

EEE-A

A primary task of a researcher is the communication of technical results to the broader scientific community. Whether in written or oral form, scientific communication is a critical step in the scientific method and is the key driver of movement within a scientific field. Therefore, the construction of a written scientific manuscript must not be taken lightly. As part of our service to the broader scientific community, we thought it may be beneficial to identify some of the common aspects of a well constructed scientific manuscript. These points are briefly discussed below. It should be noted that manuscripts that are successfully submitted to a journal for publication have three main components: (1) the overall idea, (2) the execution of the work, and (3) the presentation of the work. While each of these is critical, the guidelines presented below primarily speak to the third component, namely the presentation of the scientific work. Thus a poor idea or a poorly designed investigation cannot be saved by an excellent presentation of the work, and equally an excellent idea that is well investigated can still be doomed by a poor presentation. Hopefully the concepts described below will help to minimize the latter situation.

Structure and Approach: Scientific research must begin with a defined research question, which results in a well designed research protocol that plans the overall approach. This foundation should lead to a set of data from which the manuscript can be constructed. Manuscripts submitted to journals for consideration for publication typically have the following components.

- Title Page
- Abstract
- Introduction
- Methods

- Results
- Discussion
- Conclusions
- Acknowledgements
- References

A reasonable approach to writing a scientific manuscript may be the following. First write the Methods section, largely derived from your initial research protocol, and perhaps during the experimental phase of the work itself so that all details are included. Construct all of the figures and tables that contain the data included in the work, and then write the Results section. Depending upon the type of study, there may be some iteration in the presentation of the data and writing of the text. Reconsider the scientific questions the manuscript will address, again referring to your research protocol, and then write the Introduction. Next, use the Introduction and Results to guide the writing of the Discussion. Summarize everything in an Abstract, and then condense and refocus the Abstract into a Conclusions section. Below is a brief discussion of each of the sections. These are only suggestions on how a scientific manuscript may be written. Other strategies may also be used, but clarity should be the guiding principle. In general, the purpose of a scientific manuscript is to construct a clearly written document that describes a question and then logically presents an answer to this question that is based upon theoretical or experimental results. A scientific manuscript is meant to convey technical information to the reader. Therefore, it is generally designed to be a straightforward presentation and discussion. Paragraphs and sentences should be simply constructed.

Title Page: A title page should be included. State the title of the manuscript, which should be short and simple, as well as authors and author affiliations. Indicate the journal to which the manuscript is being submitted. Provide approximately 5 key words, as well as a short title (sometimes referred to as a running title) for the manuscript. Finally, provide complete contact information for the corresponding author.

ABSTRACT:

The abstract is typically a single paragraph. The abstract should be considered as an independent document, so that the abstract does not rely upon any material in the body of the report and, similarly, the body of the report does not rely upon any material in the abstract. The first sentence should clearly state the objective of the experiment. If the experiment is based upon a hypothesis, which is greatly preferred, the hypothesis should be stated and followed with statements describing its basis and evaluation. The subsequent sentences describe how the investigation was carried out. The following sentences describe, with as much precision as possible without being verbose, the results of the experiment. The final sentences describe the significance of the results and the impact of this work on the general field of study.

INTRODUCTION:

The introduction requires a short review of the literature pertaining to the research topic. The introduction is then best constructed as a descriptive funnel, starting with broad topics and slowly focusing on the work at hand. Perhaps three to four paragraphs are needed. One approach may be to start with one or two paragraphs that introduce the reader to the general field of study. The subsequent paragraphs then describe how an aspect of this field could be improved. The final paragraph is critical. It clearly states, most likely in the first sentence of the paragraph, what experimental question will be answered by the present study. The hypothesis is then stated. Next, briefly describe the approach that was taken to test the hypothesis. Finally, a summary sentence may be added stating how the answer of your question will contribute to the overall field of study.

METHODS:

This section should be a straightforward description of the methods used in your study. Each method should be described in a separate section. Begin, in a single section, with a statement of the materials used in the study, indicating the vendor and vendor contact information for each material. This information is critical so that readers have the capability to repeat the work in their own institutions. Next describe, in separate sections, each key procedure and technique used in the study. Keep explanations brief and concise. If a specific experimental design is utilized, describe this design in the second section of the Methods, after the materials section. Similarly, if a theoretical or modeling component is utilized, it should also be incorporated in the initial portion of the Methods. Finally, remember to describe the statistical analysis methods that were utilized to analyze the results, most likely in the final section of the Methods section.

RESULTS:

The Results section presents the experimental data to the reader, and is not a place for discussion or interpretation of the data. The data itself should be presented in tables and figures (see below). Introduce each group of tables and figures in a separate paragraph where the overall trends and data points of particular interest are noted. You may want to indicate the placement of a particular table or figure in the text. For experimental studies, key statistics such as the number of samples (n), the index of dispersion (SD , SEM), and the index of central tendency (mean, median or mode) must be stated. Include any statistical analysis that was performed, and make sure to indicate specific statistical data, such as p -values. Note that each table and figure in the paper must be referred to in the Results section. Be succinct.

DISCUSSION:

The discussion section, often the most difficult to write, should be relatively easy if the previous suggestions have been followed. In particular, look to the last paragraph of the introduction. If the work has characterized a phenomenon by studying specific effects, use the results to describe each effect in

separate paragraphs. If the work has presented a hypothesis, use the results to construct a logical argument that supports or rejects your hypothesis. If the work has identified three main objectives for the work, use the results to address each of these objectives. A well-defined study that is described in the Introduction, along with supporting results that are presented in the Results section, should ease the construction of the Discussion section. Begin the Discussion section with a brief paragraph that again gives an overview to the work. Summarize the most important findings and, if applicable, accept or reject the proposed hypothesis. Next, identify the most interesting, significant, remarkable findings that were presented in the Results section, and contrast these

findings in light of other studies reported in the literature.

Conclusions: Again, first introduce the work and then briefly state the major results. Then state the major points of the discussion. Finally, end with a statement of how this work contributes to the overall field of study.

Acknowledgements: Provide a brief statement acknowledging the efforts of any participants or consultants who are not included as authors of the manuscript. State all of the funding sources for the work, ensuring that the statement adheres to the guidelines provided by the funding institution



Vision



**TO BECOME A HIGH STANDARD OF EXCELLENCE IN EDUCATION,
TRAINING AND RESEARCH IN THE FIELD OF
ELECTRICAL AND ELECTRONICS ENGINEERING
AND ALLIED APPLICATIONS**



Mission



**TO PRODUCE EXCELLENT, INNOVATIVE AND NATIONALISTIC ENGINEERS
WITH ETHICAL VALUES AND TO ADVANCE IN
THE FIELD OF ELECTRICAL AND ELECTRONICS ENGINEERING
AND ALLIED AREAS**