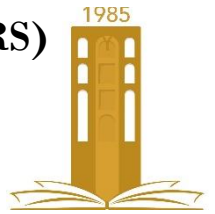




The Minister of Higher Education and Scientific Research (MESRS)



**University of Mohamed Boudiaf, M'sila –UMB–
Faculty of Technology**



First Year, Common Base, ST

S2 - 2022/2023

Module: English 02

Lecture 01:

Electrical Engineering - Key Technical Term

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Time: 09:30h-11:00h

In the lecture hall: ST 04

The four skills of learning English are:

Listening: is the ability to understand spoken English in various situations, including conversations, lectures, and broadcasts.

Speaking: is the ability to express oneself in English through conversation and speaking tasks.

Reading: is the ability to understand written English in different texts, including books, articles, and emails.

Writing: is the ability to express oneself in written English, including composition, email writing, and report writing.

The key elements of English for scientific writing include:

- ✓ Clarity and precision: Scientific writing should be clear, concise, and precise, using technical vocabulary appropriately and avoiding mystery.
- ✓ Objectivity: Scientific writing should be objective and avoid personal opinions and subjective language.
- ✓ Formal tone: Scientific writing should have a formal tone and use correct grammar, spelling, and punctuation.
- ✓ Structured format: Scientific writing should follow a structured format, including an introduction, methodology, results, discussion, and conclusion.
- ✓ Present tense: Scientific writing should use present tense to describe results and findings.
- Building a strong scientific vocabulary is important in scientific writing for clarity, understanding, and effective communication.

I. Brief overview of electrical engineering as a field:

Electrical engineering is a branch of engineering that deals with the study and application of electricity, electronics, and electromagnetism. It involves the design, development, and maintenance of electrical systems and devices, including power generation and distribution systems, electronic devices, and communication systems. Electrical engineers play a critical role in shaping our modern world by developing technologies that power our homes, businesses, and communication networks.

II. Importance of mastering technical terms in electrical engineering:

Mastering technical terms in electrical engineering is crucial for effective communication, problem-solving, career advancement, and improved understanding of the subject. It provides a common language for electrical engineers to describe and analyze complex systems, demonstrates a deep understanding of the field, and simplifies complex concepts for better understanding.

III. Key Technical Terms

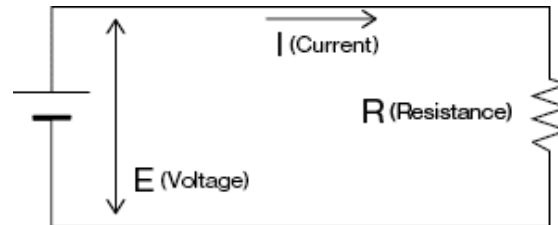
A. Circuit Analysis

Voltage (V): also known as electric potential difference, measures the electric potential energy per unit charge in an electrical circuit. It is expressed in volts (V) and represents the energy that drives the flow of electric current in a circuit.

Current (I): is the flow of electric charge in a circuit, measured in amperes (A). It represents the rate of flow of charge and is determined by voltage and resistance.

Resistance (R): is the opposition to electric current flow in a circuit, measured in ohms (Ω). It slows down current and converts electrical energy into heat energy, affecting the behavior of the circuit.

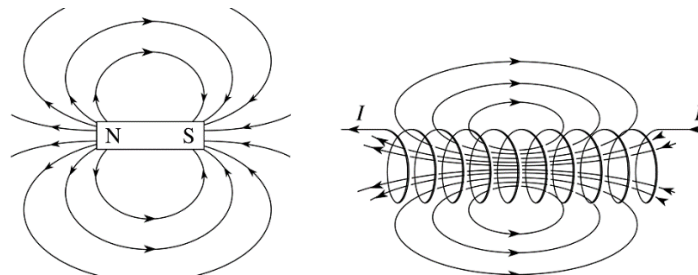
Power (P): is the rate of energy transfer or conversion in an electrical circuit, measured in watts (W). It is calculated as the product of voltage and current ($V \times I$) and represents the rate at which electrical energy is used in a circuit.



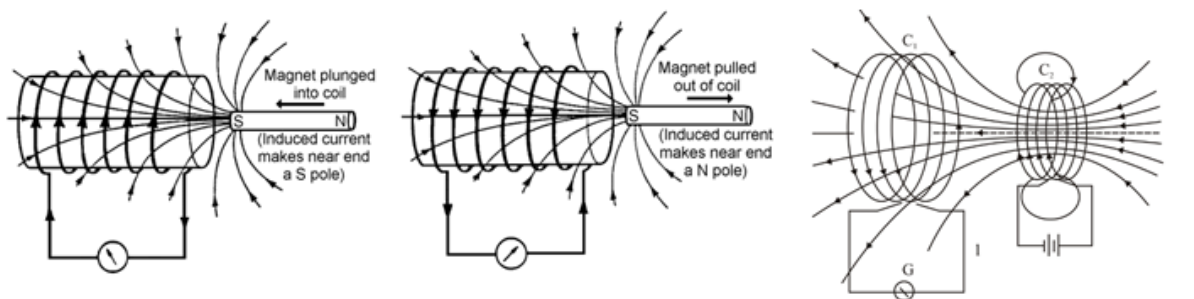
B. Electromagnetism

Electromagnetism: is the study of the interaction between electric and magnetic fields and the behavior of charged particles in these fields. It includes electric fields, magnetic fields, electromagnetic radiation, and electromagnetic induction and has practical applications in electricity generation, motors, generators, and electronic devices.

Magnetic Field: is a field of force around a magnet or moving electric charge that affects the motion of charged particles. It is measured in Tesla (T) and plays a key role in electrical and electronic applications, including motors, generators, and transformers.



Electromagnetic Induction: electromagnetic induction is the process by which a changing magnetic field or electric current induces a voltage in a conductor. It was discovered by Faraday and is the basis for generators, transformers, and other electrical devices. Induced voltage can generate current, making it a key process in electrical power generation and distribution.



Changing magnetic field by a moving magnet

Changing magnetic field by a changing electric current

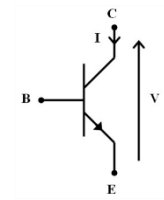
C. Electronic Devices

Diode: is a 2-terminal electronic device that allows current to flow in only one direction. It is made of a semiconductor material with p-type and n-type

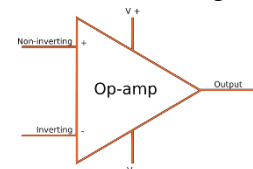


regions and is used in power supplies, rectifiers, voltage regulators, switching circuits, and light detectors.

Transistor: is a semiconductor device used to amplify or switch electronic signals. It is made up of three layers of a semiconductor material, typically silicon, with different impurities added to control its electrical properties. Transistors have revolutionized the electronics industry and are used in a wide range of applications, including radio and television sets, computers, and mobile devices.



Operational Amplifier (Op-Amp): is a type of integrated circuit that can be used as a high-gain amplifier, comparator, or as a building block for various other circuits. Op-Amps have many applications, including signal amplification, filtering, and conversion, and are widely used in a variety of fields such as audio, telecommunications, and medical equipment

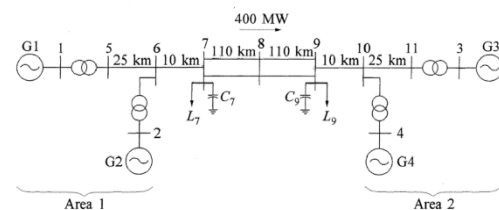


Integrated Circuit (IC): is a miniaturized electronic circuit consisting of active and passive electronic components (transistors, diodes, resistors, capacitors, etc.), it is manufactured on a single piece of semiconductor material (typically silicon). They are widely used in a variety of applications such as computers, telecommunications, consumer electronics, and industrial control systems.



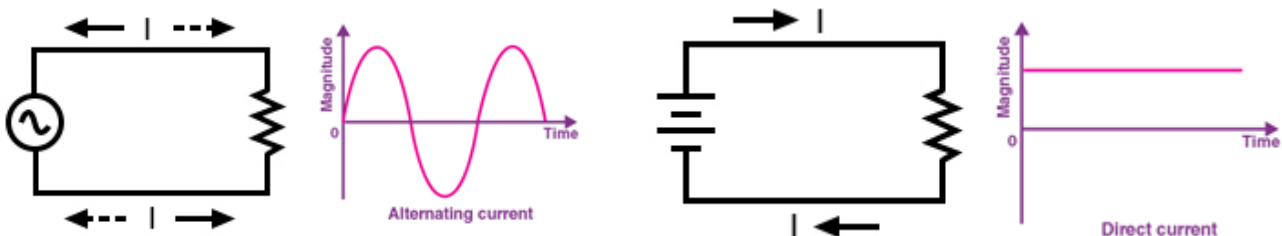
D. Power Systems

Power System: is the interconnected system of power generation, transmission, distribution and consumption infrastructure that delivers electricity to customers. It consists of power plants, transmission lines, substations, transformers and distribution lines, which are connected and managed to ensure an adequate and reliable supply of electricity.



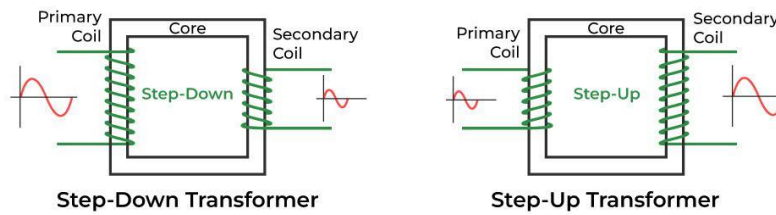
Alternating Current (AC): is an electric current, which periodically reverses direction, in contrast to direct current (DC) which flows only in one direction.

Direct Current (DC): is electrical current, which flows consistently in one direction.



Transformer: a transformer is an electrical device that is used to transfer electrical energy from one circuit to another through electromagnetic induction. In power systems, transformers are used to step up or step down voltage levels for transmission and distribution of electrical power.

Types of Transformer



IV. Emphasis on continued learning and mastery of technical terms.

Continuous learning and mastery of technical terms is important in electrical engineering to stay current with developments and technologies, communicate effectively, and expand one's knowledge. This can be achieved through reading technical materials, attending workshops/seminars, joining professional organizations, and participating in research,

➤ Grammar Tips

- The pronoun "that" is used as a conjunction to connect sentences, and can also be used as a relative pronoun to introduce a sentence that provides additional information about a noun or pronoun in the main clause.

As a conjunction:

Example: Electrical engineering is a branch of engineering that deals with the study and application of electricity, electronics, and electromagnetism.

As a relative pronoun:

Example: The branch of engineering that deals with the study and application of electricity, electronics, and electromagnetism is electrical engineering.

In both examples, the pronoun "that" is used to introduce a clause that provides additional information about the noun "branch of engineering." It serves to connect the two clauses and provide more specific information about the noun being referred to.

- In scientific writing, the present tense is typically used in several cases:
 1. To describe established facts or general truths: For example, "Water boils at 100°C at sea level."
 2. To describe the methodology of an experiment: For example, "The experiment consists of measuring the resistance of a wire."
 3. To describe the results of an experiment: For example, "The data shows that the resistance of the wire increases with temperature."
 4. To describe the current state of a process or a system: For example, "The solar cell converts light into electrical energy."

It's important to use the present tense consistently within a scientific paper or article, as it provides a sense of immediacy and relevance to the reader and helps to get the information in a clear and concise manner.

Vocabulary Tips

- Here are some synonyms for "Importance" in the context of the "Importance of mastering technical terms in electrical engineering":
 - ✓ Significance
 - ✓ Relevance
 - ✓ Necessity

- ✓ Criticality
- ✓ Essentiality
- ✓ Worth

Note: The specific synonym that would be appropriate will depend on the context and the tone desired in the writing.