

Ministry of Higher Education and Scientific Research

Relizane University

Faculty of Sciences and Technology

Department of Electrotechnic and Automatic

Academic year: 2024-2025

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This course is intended for third year students of the Bachelor's degree in Electrical Engineering (Discoveries).

It is delivered in English, [a translation of the course to allow students to avoid them to translate (saving time) and assimilate well (understand) is attached].

It is presented in the form of a Question and Answer.

It should be noted that the exam will be in English and not in French.

ELECTRICAL SYSTEMS DESIGN

Part I:

How do you design an electrical system ?

You need to assess the availability and reliability of the power supply, the load demand and distribution, the environmental and safety factors, and the potential challenges and risks. You also need to review the applicable codes, standards, and regulations that govern the electrical system design and installation.

How do you design an electrical system.

What are some examples of electrical systems?

Examples of Electrical Systems Facilities and Networks

- Substations.
- Powerlines.
- Drainage channel or irrigation system.
- Water or sewer line system.
- Generation Plant.
- SCADA (SCADA stands for Supervisory Control and Data Acquisition. SCADA is a computer system that collects and analyzes data in real time to monitor and control equipment handling critical and urgent materials or events)

What is system design in electrical engineering ?

Electrical system design is the design of electrical systems. This can be as simple as a flashlight cell connected through two wires to a light bulb or as involved as the Space Shuttle. Electrical systems are groups of electrical components connected to carry out some operation. This can be as simple as a flashlight cell connected through two wires to a light bulb or as involved as the Space Shuttle. Electrical systems are groups of electrical components connected to carry out some operation. Often the systems are combined with other systems. They might be subsystems of larger systems and have subsystems of their own. For example, a subway rapid transit electrical system is composed of the wayside electrical power supply, wayside control system, and the electrical systems of each transit car. Each transit car's electrical system is a subsystem of the subway system. Inside of each transit car there are also subsystems, such as the car climate control system.

What is electrical design ?

Electrical design entails planning, creating, testing, or supervising the development and installation of electrical equipment, including lighting equipment, power systems, power distribution, fire and life safety systems, electronic components, and voice and data communications infrastructure.

How to design a system example?

How to create a design system ? A step-by-step process

1. Step 1: Research. ...
2. Step 2: Assemble the team. ...
3. Step 3: Define scope and goals. ...
4. Step 4: Identify components. ...
5. Step 5: Design the system's components and architecture. ...
6. Step 6: Create the design documentation. ...
7. Step 7: Develop UI components. ...
8. Step 8: Create development guidelines.

How to master electrical design ?

1. 1 Learn the basics. Before you dive into complex or specialized electrical design projects, you need to have a solid foundation of the basic concepts and theories. ...
2. 2 Practice with software. ...
3. 3 Work on projects. ...
4. 4 Seek feedback. ...
5. 5 Keep learning. ...
6. 6 Here's what else to consider.

What are 3 electrical examples?

Electric energy can be kinetic or potential. Examples of electrical energy include batteries, lightning, and electrical charges moving through a wire plugged into the wall socket to power electrical appliances such as televisions and computers.

What is the basic concept of electrical system ?

A basic electrical circuit is simple – it consists of a power source, connected by a conductor to a load device, and controlled by a switch, allowing the flow of electrons to power a load.

What are the basic electrical design concepts ?

Voltage, Current, Resistance and Ohm's Law

These are the three basic building blocks required to manipulate and utilize electricity. With a constant voltage source, we can see how current and resistance change. With a high resistance, there will be very low current flowing through the load.

What is an electrical systems designer ?

Electrical designers create electrical systems. Using their expertise on how electricity works, they come up with wiring and power distribution diagrams to fit the needs of individual projects. This might entail examining the electrical needs of a new building and figuring out how best to supply it.

How to design an electrical system ?

What is Included in Electrical Design ?

1. Schematics: Detailed diagrams showing how components are connected.
2. Physical Layouts: Blueprints of where components will be located.
3. Bill of Materials : A list of all components required.
4. Safety Protocols: Guidelines to ensure safe installation and operation.

How many types of electrical design are there?

The four fundamental types of electrical drawings are schematic, wiring, block, and pictorial.

What is an electrical design plan ?

What is an electrical plan? It is the visual and drawn description of our building's circuits and electrical properties, also known as wiring diagram or electrical drawing. It includes lines, and symbols in a layout that represents the electrical system of the property, usually designed by an electrical engineer.

What are system design tools?

System design tools are software applications or frameworks that help you visualize, model, document, and communicate your system design decisions

What is the structure of system design ?

What is a Design System Structure? A design system structure is a comprehensive framework that helps manage design at scale by providing a set of shared principles, patterns, and tools. It enables a consistent, coherent, and efficient design process across multiple teams and projects.

What do electricians design ?

Electrical designers create and design electrical systems turning to their expertise on how electricity works to create wiring and power distribution diagrams that fit an individual project's needs. They examine the electrical needs of new buildings to best supply it.

Who designs electrical components ?

Electrical engineers design, develop, test, and supervise the manufacture of electrical equipment, such as electric motors, radar and navigation systems, communications systems, or power generation equipment.

Who is an electrical design engineer?

An electrical design engineer is a professional who develops electrical systems such as alarms and lighting. They use vast knowledge of the principles of physics and material sciences to help create solutions for new electrical systems and provide maintenance or installation services to current electrical systems

What are electrical systems examples?

The smartphone you use to communicate with your friends, the television you use to watch your favorite programs, and the electrical wires running along the side of the highway. What do all these things have in common? They are all examples of electrical systems that play a significant part in our daily lives.

What is a system in electrical?

An electrical system consists of many different forms of components such as motors, resistors, capacitors, and transistors. These components are designed to be connected in an electrical circuit.

How does an electrical system work?

Electricity travels from the service panel to home appliances through the hot conductor, and returns the current to the main service panel through the neutral conductor. A third or “grounding” wire is also connected to all outlets and metal boxes in your home.

What are the 3 rules of electrical?

We've organized these principles into three basic rules:

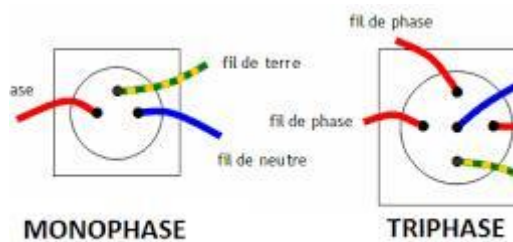
- Rule 1 – Electricity will always want to flow from a higher voltage to a lower voltage.
- Rule 2 – Electricity always has work that needs to be done.
- Rule 3 – Electricity always needs a path to travel.

What are the three basic elements of all electrical systems?

Every circuit is comprised of three major components :

- a conductive "path," such as wire, or printed etches on a circuit board;
- a "source" of electrical power, such as a battery or household wall outlet, and,
- a "load" that needs electrical power to operate, such as a lamp.

Why 400 volts ?



Benefits of 400V 3 Phase Power

It means you can use it for large industrial applications that require a lot of power. Another benefit is that it is more efficient than a single-phase system. It means that less energy is lost during transmission and distribution.

How to design an electrical system for buildings ?

How do you approach electrical design for different types of buildings and facilities?

1. Identify the requirements. Be the first to add your personal experience.
2. Select the system type. ...
3. Design the power distribution. ...
4. Design the lighting. ...
5. Design the communication. ...
6. Design the special systems. ...
7. Here's what else to consider.

What is electrical system diagram?

Electrical wiring diagrams are essential documents in the field of electrical engineering. They provide a visual representation of the electrical system, making it easier to plan, install, troubleshoot, and maintain electrical circuits.

What is the concept of electrical design ?

Electrical design is the process of planning, creating, and documenting the electrical systems for a building, machine, or device. It involves selecting the appropriate components, calculating the loads and currents, and ensuring compliance with safety and quality standards.

What are electrical design principles?

It involves applying scientific and engineering principles, such as circuit theory, signal processing, power distribution, and control systems, to achieve functional and efficient solutions.

How do you design an electrical layout?

How to Draft an Electrical Plan ?

1. Step 1: Know Your Layout. ...
2. Step 2: Plan it in Advance. ...
3. Step 3: Use Interior Layout as Your Starting Point. ...
4. Step 4: Walk Through Your Plan. ...
5. Think About Furniture Placement. ...
6. Plan for Additional Outlets. ...
7. Utilize Different Types of Lights.

How to start electrical design ?

How do you start an electrical design project?

1. Define the scope.
2. Conduct research.
3. Generate concepts.
4. Select a design.
5. Plan the implementation. Be the first to add your personal experience.
6. Review the design.
7. Here's what else to consider.

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