University May 8, 1945, Guelma
Faculty of Science and Technology

1st year License ST

Course: Professions in science and technology 1

KASSA-BAGHDOUCHE L.

Année Universitaire 2023/2024

Content of the subject :

1. General Introduction
2. Professions in Electronics Engineering
3. Professions in Electrical Engineering
4. Professions in Telecommunications
5. Professions in Biomedical Electronics
6. Professions in Automation

2

General Introduction

3

General Introduction

What is Professions in science and technology ?

Sciences based on calculation and observation (Mathematics, Physics, Chemistry … etc)

Professions in science and technology

A **profession** is the exercise by a person of an activity in a professional field, with a view to remuneration.

Study of industrial **techniques** considered as a whole or in a field of activity

General Introduction

Some examples of professions

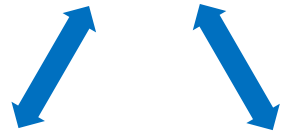
- Teacher
- Scientific researcher
- Engineer-Architect
- Pharmacist
- Doctor
- Military
- Musician
- Electrician
- Journalist
- Pilot
- An accountant
- Translator
- Administrator
- Musician
- Hotelier
- Mechanic

5

General Introduction

How to choose a profession ?

You must conduct a survey on professions



You must conduct a study of the professional environment.

You must conduct a survey on sectors of activity

General Introduction

- The common core training courses are of the type **LMD** (**L**icense, **M**aster, **D**octorate), in the field of Science and Technology.
- There are many specialties that are offered to students admitted with merit ranking :

- ✓ **Electronic engineering**
- ✓ **Biomedical engineering**
- ✓ **Telecommunication engineering**
- ✓ **Automatic engineering**
- ✓ **Electrical engineering**
- ✓ **Mechanical engineering**
- ✓ **Aeronautics engineering**
- ✓ **Climate engineering**
- ✓ **Civil Engineering**
- ✓ **Process engineering**

7

Professions in Electronics engineering

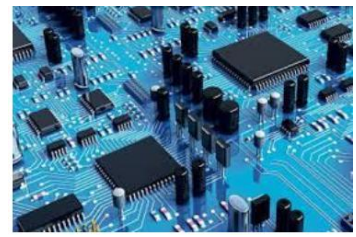
Electronics have largely penetrated in our lives:

- Cell Phones,
- Equipment of our cars,
- Computers
- Media players,
- household appliances that we have at home.

8

Professions in Electronics engineering

What is electronics ?



- Electronics is the science of controlling the movements of electrons.
- Electronics is a branch of applied physics, dealing, among other things, with the **shaping and management** of electrical signals, allowing for example the transmission and reception of information.
- More recently, we can say that electronics is **the set of techniques** that use electrical signals to capture, transmit and use information.

9

Professions in Electronics engineering

Scope of application of electronic engineering:

Telecommunications:

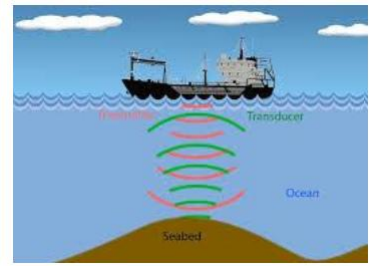
- Telegraphy,
- Telephony,
- Data transmission,
- Broadcasting,
- Television,
- Telemetry,
- Remote.

10

Professions in Electronics engineering

Detection systems:

✓Radar,
✓Sonar,
✓Remote sensing.



11

Professions in Electronics engineering

Electroacoustics:
Registration and reproduction of the sound

12

Professions in Electronics engineering

Le champ d'application des dispositifs électroniques :

Data processing :
- ✓Computers
- ✓Calculators

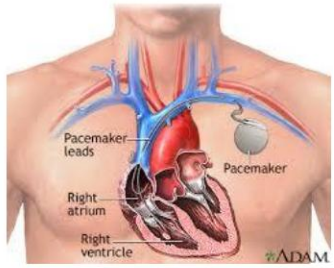
13

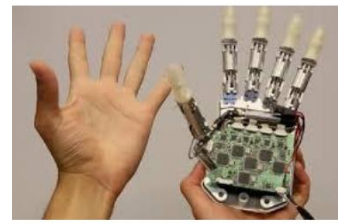
Professions in Electronics engineering

Industrial electronics:
- ✓**Controls and adjustments Automatic**
- ✓ **Surveillance system installations**

14

Professions in Electronics engineering





Biomedical electronics

✓Pace Maker (Pile cardiaque),

✓Prothèses, ...

15

Professions in Electrical engineering

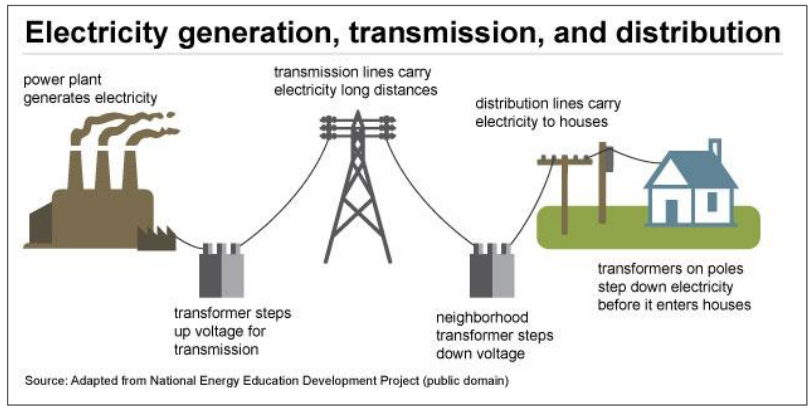
What is electrical engineering?

- It is a study of the **technical applications** of electronics.
- It is a discipline that studies **production, transport, the treatment, transformation and use** of **electrical energy**.
- Electrical engineering is associated with "**strong currents**" as opposed to "**weak currents**" which would be the exclusive domain of electronics.

Professions in Electrical engineering

Fields of application of electrical engineering

- **Production and transportation of electrical energy** (Thermal stations, nuclear stations, solar stations, wind stations, …)



Professions in Electrical engineering

Fields of application of electrical engineering

- **Fabrications of electrical equipment** (electric motors, circuit breakers, contactors, switches)

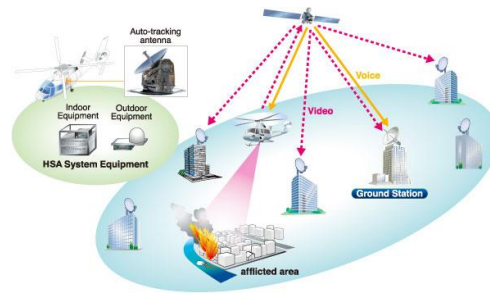
Professions in Electrical engineering

The professional fields that represent electrical engineering professions are found in the following areas:

- **Electrical machines (electric motors, generators, alternators, converters, etc.)**
- **Electrical voltage transformers,**
- **Electrical networks (BT, MT, HT)**
- **Storage (battery, capacitors)**
- **Electrical installation and safety equipment (meters, circuit breakers, disconnectors, cables electric,….)**

Professions in Telecommunications engineering

- The function of a **communication system** is to ensure the transport of information between a transmitter and one (or more) receiver(s) connected by a communication channel or medium. Such information is transported in the form of a signal.
- Examples of communication systems are: Satellite Communication System



Professions in Telecommunications engineering

The telecommunications engineer **imagines, designs, develops, manages and secures** communication networks promoting exchange information in the form of signals, images, sounds and films.

Their field of activity is located at • computer science, electronic and telecommunications.

Professions in Telecommunications engineering

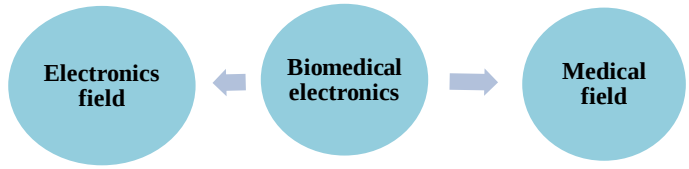
Professional outlook

- **Companies** or **administrations** which must set up and manage a computer network (multinationals, banks, hospitals)
- **Telecommunications companies**
- Service companies that develop around the Internet.
- Research and teaching
- Consulting engineering offices

Professions in Biomedical electronics

What is Biomedical electronics ?

❖ Biomedical electronics is an **application of principles and techniques of electronic engineering in the medical field** aimed at control of biological or developmental systems devices used for the diagnosis and treatment of patients.



Professions in Biomedical electronics

❖ Some examples of devices and biomedical equipment designed for treatment and diagnosis

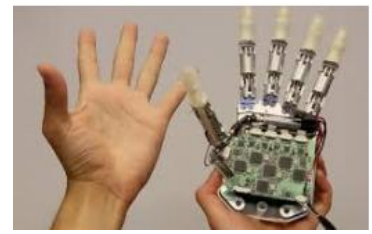
- ➢Artificial respirators
- ➢Heart monitors
- ➢Defibrillator monitors
- ➢Extracorporeal circulation devices for heart surgery

Professions in Biomedical electronics

❖ Some examples of devices and biomedical equipment designed for treatment and diagnosis

➢Medical imaging systems (including ultrasound machines, electroencephalographs, scanners, MRI)

➢Prosthetics, pacemakers

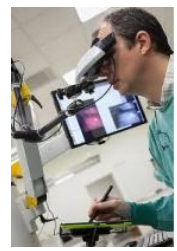


Professions in Biomedical electronics

❖ Some examples of devices and biomedical equipment designed for treatment and diagnosis

➢ Microsurgery devices and assisted surgery by computer

➢ Clinical laboratory analyzers



Professions in Biomedical electronics

The **biomedical engineer** consists of ensuring the **installation**, **commissioning**, **calibration**, **maintenance**, **verification**, **safe operation, construction and modification** of electronic equipment of type biomedical according to the indications and standards established within a hospital establishment mainly, but also within other establishments (companies specializing in maintenance biomedical equipment, equipment manufacturers biomedical, etc.).

Professions in automation

What is automatic ?

Automatic is the set of **scientific methods and technological means** used for the design of systems that can operate without intervention human during their normal operating phase.

Professions in automation

What is an Automation Engineer?

- **Automation engineers** work on developing and implementing automation solutions for businesses. They use various programming languages to create or improve computer systems that automate tasks or processes.
- **Automation engineers typically** work in organizations that are in the technology, manufacturing, or service sectors.


Professions in automation

The Role of an Automation Engineer

An automation engineer designs and implements automated solutions for business processes. Their work can involve writing code to create and manage systems, working with data, and troubleshooting issues. They might also be involved in product development or system design.

An automation engineer's job is to design and implement automated solutions for business processes. These solutions can involve working with data, troubleshooting issues, and more. Additionally, an automation engineer might be involved in product development or system design.


Professions in automation

The Skills & Qualifications of an Automation Engineer

An automation engineer is responsible for creating, modifying, and maintaining automation software. They must have strong programming skills, as well as knowledge of industrial automation systems. The engineer will typically work on a project from start to finish, ensuring that the automation software functions as intended.