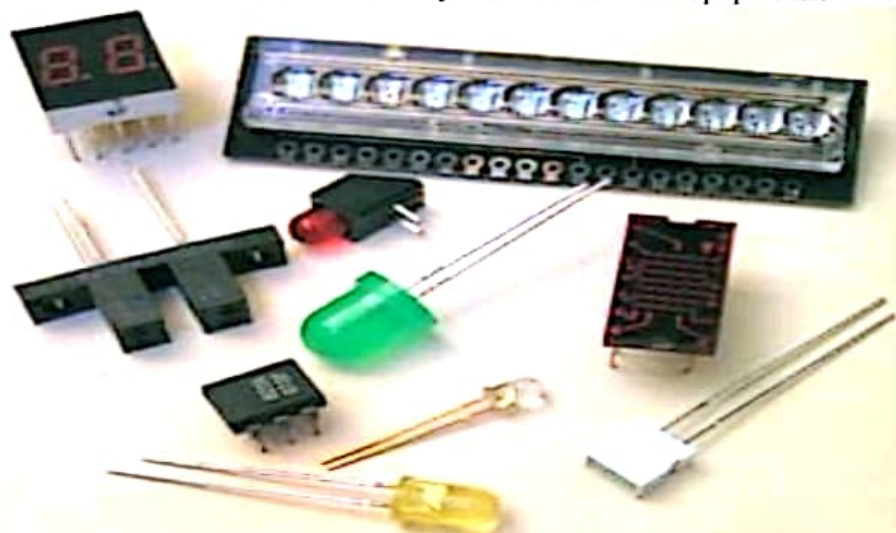


## INTRODUCTION

Optoelectronics is the communication between optics and electronics which includes the study, design and manufacture of a hardware device that converts electrical energy into light and light into energy through semiconductors. This device is made from solid crystalline materials which are lighter than metals and heavier than insulators. Optoelectronics device is basically an electronic device involving light. This device can be found in many optoelectronics applications like military services, telecommunications, automatic access control systems and medical equipments.



### **Optoelectronics Devices**

This academic field covers a wide range of devices including LEDs and elements, image pick up devices, information displays, optical communication systems, optical storages and remote sensing systems, etc. Examples of optoelectronic devices include telecommunication laser, blue laser, optical fiber, LED traffic lights, photo diodes and solar cells. Majority of the optoelectronic devices (direct conversion between electrons and photons) are LEDs, laser diodes, photo diodes and solar cells.

### **Types of Optoelectronics Devices**

Optoelectronics are classified into different types such as

- Photodiode
- Solar Cells
- Light Emitting Diodes
- Optical Fiber
- Laser Diodes
- LDR

## **UNIT- I - LIGHT-EMITTING DIODES – LED**

### **1.1 INTRODUCTION:**

A **light-emitting diode (LED)** is a P-N semiconductor diode which acts as a light source that emits light when current flows through it. Electrons in the semiconductor recombine with holes, releasing energy in the form of photons. The colour of the light (corresponding to the energy of the photons) is determined by the energy required for electrons to cross the band gap of the semiconductor. White light is obtained by using multiple semiconductors or a layer of light-emitting phosphor on the semiconductor device.

Introduced as an electronic component in 1962. The earliest LEDs emitted low-intensity infrared (IR) light. Infrared LEDs are used in remote-control circuits, in variety of consumer electronics. The first visible-light LEDs were of low intensity and limited to red. Modern LEDs are available across the visible, ultraviolet (UV), and infrared wavelengths, with high light output.