POORNIMA

COLLEGE OF ENGINEERING

DETAILED LECTURE NOTES

Campus: .... Course: .... Class/Section: .... Date: ....
Name of Faculty: .... Name of Subject: .... Code: ....

Unit 5 — Robotics

What is Robotics?

- Branch of AI, that helps study the creation of intelligent robots or machines.

It combines Electrical Engineering, Mechanical Engineering cy cs and Engineering, construction and Application of Robots.
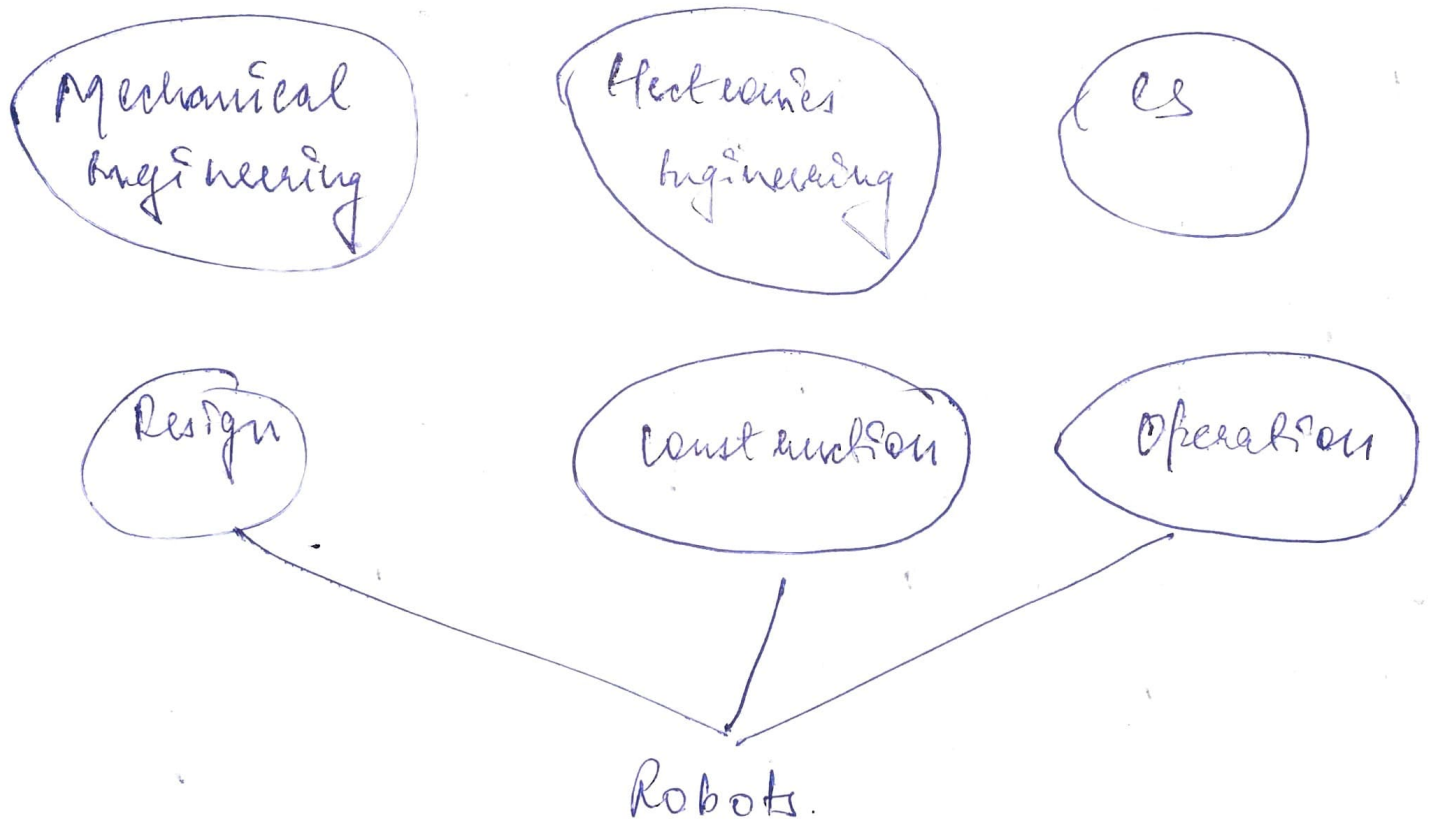
Aspects of Robotics

- Have Mechanical Construction, form, or shape designed to accomplish a particular task.

- Have Electrical components which power by control the Machinery.

- Contains some level of Computer Program that determines what, when and How a Robot does something.

What is a Robot?

Machinary that looks like a Human, and is capable of performing out of Box Actions and Replicating certain Human movements automatically by means of commands given it to using programming.

eg: Drug Compounding Robot, Automobive Industry Robots, Order Picking Robots, etc.

Mechanical Engineering

Electronics Engineering

CS

Design

Construction

Operation

Robots.

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Components of Robots:

○ **Power Supply** : Robots are powered by Batteries, solar power, hydraulic, or pneumatic power sources.

○ **Actuators** : Actuators are the devices that are responsible for moving and controlling the system or machine. It helps to achieve physical movements by converting energy like Electrical, hydraulic and air, etc.

○ **Electric motors** (AC/DC): These are the devices that convert Electrical energy into mechanical energy and are required for the Rotational motion of the machine.

○ **Pneumatic Air muscles** : contract almost 40% when air is sucked in them.

- Muscles wire: made up of nickel - titanium alloy called Nitinol and are very thin in shape. It can also extend and contract when a specific amount of heat and electric current is supplied into it. Also, it can be formed and bent into different shapes when it is in its martensitic form. They can contract by 5%. when electric current passes through them.

- Piezo motors and Ultrasonic motors they are electrical devices that receive an electric signal and apply a directional force to an opposing ceramic plate, it helps a robot to move in the desired direction. They are best suited electrical motors for industrial Robots.

Sensors: Provides abilities like see, hear, touch and movement like humans. Sensors are the devices or machines which help to detect the events or changes in the environment and send data to computer processor. These devices are usually equipped with other electronic devices.

→ Real time information to computer processors