FACULTY OF ENGINEERING AND TECHNOLOGY

Introduction: Materials

It is the field of the design and discovery of new materials. A material is defined as a substance (most often a solid, but other condensed phases can be included) that is intended to be used for certain applications.

A **material** is a mixture of substances that constitutes an object. Materials can be pure or impure, living or non-living matter. Materials can be classified based on their physical and chemical properties.

Materials can generally be further divided into two classes: crystalline and non crystalline. The traditional examples of materials are metals, semiconductors, ceramics and polymers.

Scope of Material Science

The research on materials chemistry at present is based on the development of new materials using chemicals and limited natural resources. These research are mainly aimed towards the perspective of future resources and the development of improved chemical materials. These research are mainly the applications of one stream into another. Few of the preferred topics in both Research and Industries are as follows:

- Petrochemicals
- Green Chemistry
- Plastics Processing
- Glass Processing
- Paper and Cardboard Processing
- Mesoporous Materials Synthesis
- Organic electronics
- Research on Organ catalysis and Photo catalysis
- Research on Water Splitting

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Overview of Different Engineering Materials and Applications

Engineering materials refers to the group of materials that are used in the construction of manmade structures and components. The primary function of an engineering material is to withstand applied loading without breaking and without exhibiting excessive deflection.

Metals

Metals are the most commonly used class of engineering material. Metal alloys are especially common, and they are formed by combining a metal with one or more other metallic and/or non-metallic materials.

Ferrous Alloys

Ferrous alloys have iron as the base element. These alloys and include steels and cast irons. Ferrous alloys are the most common metal alloys in use due to the abundance of iron, ease of production, and high versatility of the material. The biggest disadvantage of many ferrous alloys is low corrosion resistance.

- Carbon Steel
- Low-Alloy Steel
- Tool Steel
- Stainless Steel
- Cast Iron
- Aluminum Alloys