Engineered Materials (SC221)

Instructor

Anil K. Roy

Class Timings

Tuesday (9:00-9:55)
Wednesday (12:00-12:55)
Friday (12:00-12:55)

LT-2

Purpose

- Material science has been advancing in tandem with technologies
- Sports, Avionics, Robotics, Biomedical devices may be the most visible market drivers
- Upcoming needs for lighter, tougher materials, in lighting, heat resistant material, water resistant material, various implants (inside the body), communication, strategic applications …

Purpose

Some examples are:

- Graphene
- Nanocarbon
- High speed semiconductor device materials, viz., GaAs, GaN
- …

Purpose

There is a wide range of smart materials such as

- Piezoelectric,
- Ferromagnetic alloys,
- Shape memory alloys,
- Electro-active polymers,
- Spintronics …

These have revolutionized smart material sensors and actuators

Purpose

These are materials which show strong couplings between the applied stimuli such as

electrical, magnetic, optical or thermal field

with their mechanical properties, viz.,

elasticity, viscosity etc.

Such couplings provide built-in mechanisms for sensing and actuation. In particular, they provide promising solutions in emerging areas such as

biomanipulation, prosthetics, implantable drug delivery systems, wearable devices, and scanning probe microscopy.

Purpose

Objective is to make you familiar with most of these materials and their properties, as far as possible, which you will be using all through your professional career as engineers or as educators.

Some Scenarios

Find out Yourselves

Evaluation & Grading