MT203 Aug 3:0

Materials Design and Selection

Instructor

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Email:

Department: Materials Engg

Course Time:

Lecture venue:

Detailed Course Page:

Announcements

Brief description of the course

After an overview of microstructures, processing and properties in engineering materials, the students will focus on procedures for materials selection and design. The students will explore materials selection charts, and the course will involve case studies, projects as well as software packages for materials design and selection over a wide range of conditions

Prerequisites

No prerequisites, although exposure to a course on mechanical behaviour is desirable.

Syllabus

The course will consider basic knowledge and apply these to design for conditions such as elastic deformation, plastic deformation (strength), fracture, fatigue and high temperature deformation. Some aspects of processing will be discussed, together with issues of scale and costs. The significance of sustainability will be highlighted. Although focussed largely on mechanical design, some aspects involving functional properties will also be considered.

Course outcomes

Encourage a combination of simple hands-on experiments and software, both individually and in groups, to develop a broad sense of various properties of materials. Recognise need to, and develop procedures to, compromise when there are conflicting objectives in design. Include awareness of ecological and sustainability issues.

Grading policy

Homework 20

Mini-projects 10

Final project 20

Mid-term 15

Finals 20

Assignments

Resources

M.F. Ashby: Materials Selection in Mechanical Design, 4th edition (2011)

M.F. Ashby and D. Johnson: Materials and Design (2002)

Ashby et al., Materials: Engg, Science, Processing and Design (2014)