A Short term online Course on

Engineering Materials: Selection Process and Design
August 10 - August 31, 2015

Coordinator: Professor Bishakh Bhattacharya
Department of Mechanical Engineering, Indian Institute of Technology Kanpur

Important Dates
Receipt of applications along with Draft: July 31, 2015
Information to the selected candidates: August 03, 2015
Course Duration: August 10 - August 31, 2015

http://www.iitk.ac.in/smss/workshop

Course Objectives
Over the last few decades, a rapid and fascinating advancement has taken place in the world of engineering materials. The availability of advanced metals and metallic alloys, ceramics, glasses, polymers and composites have extensively broadened the scope of engineering design in the fields of Civil, Mechanical, Aerospace and other structural applications. However, the increase in the range of materials has also created a sense of confusion as today’s designers often find them having too many options for selecting a suitable engineering material. Development of Material Performance Indices corresponding to different applications will help designers to take a rational approach in the selection process. This short course, based on decades of teaching at IIT Kanpur aims at discovering the “art of choosing” amidst multiple conflicting objectives like minimizing structural weight of a component while maximizing the strength, stiffness, damping and other mechanical properties. The course, following the rich tradition of interactive discourse here, will not only provide instructional material but also through a series of on-line assessments and case studies help building confidence of the students and transform them from follower to practitioner.

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This course is delivered online and consists of short, topic oriented lecture notes and reading material. We will have stand-alone quizzes to help assess the progress of students. Expected workload is about 3 hours of e-content per week.

**Course Structure**

This course is delivered online and consists of short, topic oriented lectures, notes and reading material. The broad outline of the course:

**Module 1: Introduction to Mechanical System Design:**
This will cover an extensive overview of mechanical system and embodiment design. Starting with the conceptual design and workflow during the design process, we will cover various phases of product planning, specifications and establishment of structure-function relationship. Next, we will discuss about different design solution principles and methods with a discursive bias. We will then cover axiomatic qualities, evaluation of concept variants and solution of design. Finally, we will show the general guidelines for embodiment design of mechanical system.

**Module 2: Selection of Materials for Mechanical and other Functional Property Set:**
Here we will talk about various mechanical property set, Material Performance Index, Ashby Index and Selection of Materials (Metals, Polymers, Ceramics, Glasses and Composites) against mechanical and functional property set.

**Module 3: The Design Process and Optimization:**
In this module, we will bring out the basic concept of multi-objective optimization. Starting from constrained optimization, we will discuss about contradictory performance indices that often come out in design practice. We will discuss about various optimization strategies (GA, PSO and other Evolutionary Algorithms) to solve this problem.

**Module 4: Case Studies related to (A) Automobile Body Design, (B) Aircraft Structural Elements, (c) Design of Vibration Isolator and (D) Intelligent System Design**

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Who should Attend
This course having an interdisciplinary flavor will cut across many streams of engineering. The course is highly recommended for advanced undergraduate and postgraduate students studying in the fields of mechanical, civil and aerospace engineering. Practicing engineers in the field of engineering design will also find it very useful for their applications. Teachers of engineering colleges who would like to develop similar course for advanced UG /PG students will be significantly benefitted from this course.

Course Fee
Registration fee Rs. 12,500/- payable by a crossed demand draft drawn in favor of “Continuing Education Program, IIT Kanpur” payable at State Bank of India, IIT Kanpur.

How to Apply
Those interested in attending the course are requested to fill the registration form enclosed and send the completed application along with course fee of Rs.12,500/- in the form of crossed bank draft in favor of “Continuing Education Program, IIT Kanpur” payable at State Bank of India, IIT Kanpur. The registration form, complete in all respects accompanied by the demand draft and a covering letter should reach the under mentioned on or before July 31st, 2015.

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The list of accepted candidates will be provided in the following web-link by **August 03, 2015**
http://www.iitk.ac.in/smss/workshop

**All successful candidates will be provided with certificates of accomplishment given by the Continuing Education Program of IIT Kanpur.**
REGISTRATION FORM
Short-Term Online Course on
Engineering Materials: Selection process and Design
August 08 - August 31, 2015

Name

Date of Birth

Designation

Organisation

Address for Correspondence

Phone

Fax

Email:

Research Interest

Payment Details:

Draft No.

Amount

Drawn on

Signature (Applicant)