Short Course on

Making of a Professional Engineer: Professional Ethics & Tools for Thinking

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Course description

With the ever growing globalization and competition, it is evident that the engineering professionals of the 21st century will be working increasingly in international and cross-cultural settings. It has long been felt that they must be equipped with a whole set of new social engineering skills, in addition to their technical and domain knowledge, in order to succeed in the new millennium. Some of these skills include developing creative & innovative problem solving skills, professional ethics, team work, leadership & entrepreneurial traits, inter-cultural understanding, resolution of conflicts, and effective communication, etc. As educators, one can ask the question: should teaching of such skills be a part of engineering curricula? My personal view is that the answer is unequivocal yes. The next obvious question is how to do it within the existing framework which is really constrained by the fixed duration of engineering qualifications? In other words, if these skills are to be imparted in formal class room settings, some of the existing contents must be dropped to accommodate the new elements. There is no simple answer to this dilemma, and indeed there might not be one universally valid answer to this problem. One possibility to achieve this goal is to teach the students to *learn on learn their own, i.e., always being a student for the rest of their professional life.* This, of course, is not a new concept, as illustrated by the following Chinese proverb: *"Give a hungry person a fish; he will have it for dinner. If you teach him how to fish, he will never go hungry again"*

Amongst all the social engineering skills mentioned in the preceding section, perhaps the most significant (and also the most difficult one to teach as well) is to teach them to think and about ethics (which tend to be contextual, but there are some universal virtues which cut across all cultures & societies). How does one teach these skills to students? My view is that one cannot really teach how to think, but we can certainly facilitate it. One becomes a better thinker by practicing it. Similarly, the core ideas about professional ethics can be conveyed by presenting case studies. In this presentation, we address some of these issues by way of examples of the tools used for thinking. The material presented here has been used in short term courses and workshops aimed at sharpening the problem solving skills for diverse audience. This material has also been used for 4 years to teach the first year engineering students at IIT/Kanpur.

Course structure

In particular, this series of lecture-cum-interactive sessions (8 hours of total contact time) will focus on the following aspects:

[1] Engineering as a profession

[2] Thinking: definition and role of thinking; development of problem solving skills; Tools for thinking; what is creativity? What is innovation? How to foster creativity?

[3] Professional ethics

Registration and credits

The course is open to student of IIT Gandhinagar and other institutions. A successful completion of this course will earn you one credit with pass/no-pass grade. Please register your names with Assistant Registrar (Academics) well in advance. Limited seats are available for students of other institutions, please contact Dr Jaison Manjaly <jmanjaly@iitgn.ac.in> for further details.

About the Instructor

Prof. Raj Chhabra received the 1998 *Amar-Dye Chem* and the 1996 *Herdillia* awards of the Indian institute of Chemical Engineers for excellence in research and development. He received his B.E at University of Roorkee, 1974, his M.E, IISc Bangalore, 1976, and his PhD, all in Chemical Engineering, from Monash University, Melbourne, Australia. He is a Fellow of the Indian National Academy of Engineering and is currently the *J. N. Gupta and Smt. Murti Devi Gupta Chair* in the Dept. of Chemical Engineering, IIT Kanpur