Physics esoteric, physics mundane

One of our students, after taking admission to the UG physics programme, discovered to his utter dismay that in the first year the teachers taught mundane topics like vectors, matrices, kinetic theory, thermal conductivity, viscosity, elasticity, ordinary differential equation, etc. He started wondering when esoteric topics like quantum mechanics, statistical thermodynamics, and special or general theory of relativity would be introduced.

This bright student actually took up physics by choice, because of the attraction of some of its fascinating fields. He possibly joined the programme against the wishes of his parents and the society at large. He observed that no laboratory or research institute conducts research nowadays in the fields like kinetic theory, Brownian motion, surface tension, viscosity or thermal conductivity. So why should there be a delay in the introduction of the esoteric topics? Why should the time for studying such important and advanced topics be curtailed to accommodate some widely studied and 'no more challenging' classical or 'mundane' areas?

In a well-stocked bookshop, the student found a number of books on topics like nanotechnology, quantum electrodynamics, cosmology, general theory of relativity, high energy physics, quantum optics, non-equilibrium thermodynamics, etc. In fact, there were a few books on electricity and magnetism, optics, and classical mechanics, which were mostly newer editions of some popular and widely known text and reference books published earlier. A search on the Internet for newly published books for UG students of physics revealed a similar scenario. Some of the teachers with a postgraduate degree in physics or with a Ph D in a rather mundane topic obtained a long time ago, are not much eager either to learn or to teach modern and frontline topics.

Interestingly, a section of bright students do not feel the necessity for training in some of the basic areas in physics, rather they tend to fix their goals of pursuing higher studies or research on subjects that quite often hit the headlines and are traditionally considered to be the forte of frontline scientists, mostly theoreticians. In fact, the proliferation of post-B Sc integrated Ph D programmes has created a notion among a section of students that one can really start research work immediately after graduation and the training in M Sc is not of much significance; it may be of little use to those who want to do research and not teaching.

With this scenario in mind, how should we tailor and teach the UG physics course to attract the students who want to pursue higher studies in the subject? Or how should we frame the course to cater to the need of a student who may be planning to join a school as a teacher and may not be interested in pursuing the higher studies immediately? The UG classroom happens to be the common passage for future school teachers as well as for the frontline scientists, or future computer and electronics experts, and so on. Are we in a position to cater to the needs of all of them in a common UG physics class? Can we really do away with the need for training in the basics of the subject?

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Mega schemes need mega solutions

The article by Jain *et al.*[1] is extremely informative and has discussed the issues to be addressed for successful implementation of ILR (interlinking of rivers). The authors have dealt with issues related to engineering and environmental problems. I would like to make a few points regarding this scheme. Coming to ecology, each river system has a unique fauna and flora, and we are familiar with the local delicacies. The transfer of water will definitely diminish the biological diversity and uniqueness of each river complex. Since very little systematic work has been done along these lines, 'ignorance may be a bliss' in the long run. The authors have referred to the more sensitive 'inter-state disputes concerning the sharing of river water in India and the ensuing bitterness and animosity among sections of the population'. Presently, Kaveri water is a bone of contention between two states. Now with the ILR, I can foresee a permutation and combination of more states getting involved in such disputes. The authors have not ruled out vandalism. New problems may also arise. Then there are international issues. Sometimes, there is news relating to sharing of Jhelum and Chenab waters with Pakistan. Will the 'Padma Hilsha' become an issue in Bangladesh after the manipulation of Brahmaputra and Ganga upstream? Considering the mood of the countries and states, who will guarantee the smooth running of this mega project? Under these circumstances, will the ILR have a National Regulatory Authority to take up these disputes? Any project which addresses the curses of poverty and denial is welcome, but is this mega project feasible in the present scenario in our country?

1. Jain, S. K., Vijay Kumar and Panigrahy, N., *Curr. Sci.*, 2008, **95**, 728–735.

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