

Computing and Tradition of Engineering

It is only in Computing that we have Software Engineering as a subject. Is Electrical Engineering, or Chemical Engineering a subject, or is it a Discipline? Why is Software Engineering a subject and not a discipline? I believe that it got off on a wrong foot, and we need to set that right. The subject of Computing, in the current crop of Engineering Disciplines, is the only one that does not have its Foundations in the Natural Sciences, and is an engineering discipline of non-material artifacts. Systems Engineering is another. These two disciplines are inextricably woven together: one might be tempted to say that Software Engineering works at the constructive mini level of ideas that are seen to work, and Systems Engineering is at the mega level where ideas add up. Software Engineering should be cast as an Engineering Discipline concerned with the design (and analysis) of Virtual Machines, and Software Process Engineering is an instantiation of Industrial Engineering and Management for the production of Software on a large scale (which could involve a large number of people doing intellectual labour). Since Computer software is non material, its functioning is not built on material properties, but has to be proven mathematically for each instance of computer software. Perhaps in no other engineering discipline is design and construction undertaken so readily as in the case tinkering with computer software. The concern is to transit from a craft to an engineering discipline. In this talk, I would like to underline that Software and Software Process Engineering have a lot to learn from the methods of traditional engineering disciplines. Also, I would like to demonstrate that computer software is at the cusp of doing large scale human (intellectual) work, and that its process engineering and management has a lot to offer for societal engineering concerns – a critique of the presence of humanities and social sciences in integrated engineering curricula at the IITs, and that their presence is not affected by extant engineering disciplines (can this be corrected?).