

Proposed Strategies for Teaching Ethics of Nanotechnology

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Abstract Nanotechnology and nanosciences have recently gained tremendous attention and funding, from multiple entities and directions. In the last 10 years the funding for nanotechnology research has increased by orders of magnitude. An important part that has also gained parallel attention is the societal and ethical impact of nanotechnology and the possible consequences of its products and processes on human life and welfare. Multiple thinkers and philosophers wrote about both negative and positive effects of nanotechnology on humans and societies. The literature has a considerable amount of views about nanotechnology that range from calling for the abandonment and blockage of all efforts in that direction to complete support and encouragement in hopes that nanotechnology will be the next big jump in ameliorating human life and welfare. However, amidst all this hype about the ethics of nanotechnology, relatively less efforts and resources can be found in the literature to help engineering professionals and educators, and to provide practical methods and techniques for teaching ethics of nanotechnology and relating the technical side of it to the societal and human aspect. The purpose of this paper is to introduce strategies and ideas for teaching ethics of nanotechnology in engineering in relation to

engineering codes of ethics. The paper is neither a new philosophical view about ethics of nanotechnology nor a discussion of the ethical dimensions of nanotechnology. This is an attempt to help educators and professionals by answering the question of how to incorporate ethics of nanotechnology in the educational process and practice of engineering and what is critical for the students and professionals to know in that regard. The contents of the presented strategies and ideas focus on the practical aspects of ethical issues related to nanotechnology and its societal impact. It also builds a relation between these issues and engineering codes of ethics. The pedagogical components of the strategies are based on best-practices to produce independent life-long self-learners and critical thinkers. These strategies and ideas can be incorporated as a whole or in part, in the engineering curriculum, to raise awareness of the ethical issues related to nanotechnology, improve the level of professionalism among engineering graduates, and apply ABET criteria. It can also be used in the way of professional development and continuing education courses to benefit professional engineers. Educators and institutions are welcome to use these strategies, a modified version, or even a further developed version of it, that suits their needs and circumstances.

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