Incorporating Educational and Research Components to Enhance Environmental Engineering Curriculum

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Like every other engineering discipline, environmental engineering profession also rapidly changes over the time. When it settles the age old problems with optimum solutions, it also faces new challenges and interacts with other disciplines to make the world a better place. This ever-changing dynamics expects any environmental engineering program and its educators to produce the competitive workforce that can understand and be ready for the needs of the industry.

In an environmental engineering program, the keeping up with the industry's needs can be achieved through number of ways; incorporating new educational topics and research themes into the existing environmental engineering courses, internships in the industry, developing new courses, and also updating the curriculum map.

This paper presents the incorporating process of educational and research components into a newly designed environmental engineering curriculum over a six year period. The new educational topics have been introduced into the environmental engineering courses as an objective of research grants (1) (2). A two week period of industrial wastewater treatment content was incorporated into the course, *Wastewater Treatment Systems*. Similarly a two week period was spent on the traffic related emissions of priority gases and noise pollution in *Air Quality Engineering*, while one week length lecture on the traffic related emissions of greenhouse gases and modeling was incorporated into the same course. In addition, in both courses, the students were encouraged to do term papers on these new topics. In similar fashion, the courses, *Engineering Hydrology* and *Urban Water Problems* were also infused with the topics of drought and impact of hydraulic fracturing on water resources.

Other routes of incorporating the emerging environmental problems in the curriculum and student learning were identified as the student internships in the industry and the universities, capstone project courses, *Senior Project I* and *Senior Project II*, and the guest speakers from the industry coming for the *Environmental Professional Seminar*.

However, the introduction of new topics in a course was done in the expense of less important topics that were already part of the course. While the fruits of these curriculum enhancements are yet to be seen in the form of students entering into the workforce that performs tasks with the relevant areas, the ever evolving curriculum helps the students be competitive for the industry.

References

1. Integrated Geoscience Curriculum for Workforce Development for Oil and Gas Industry. NSF-HBCU-TIP. Award Number: 1332553.
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