New Introduction to Infrastructure Course at Rowan University

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Abstract

Rowan University began offering a new two-credit course called Introduction to Infrastructure in Spring 2015. This course is required for all freshmen in the Department of Civil and Environmental Engineering at Rowan. The course was developed as part of a collaborative project funded by the National Science Foundation's Transforming Undergraduate Education in Science, Technology, Engineering, and Mathematics (NSF-TUES) Program. The collaborative group of colleges and universities involved in this NSF-TUES project is led by the University of Wisconsin-Platteville and is called the Center for Infrastructure Transformation and Education (CIT-E). The topics covered in the course include an introduction to infrastructure, public financing and economics, social impacts of infrastructure, water resources engineering, environmental engineering, geotechnical engineering, structural engineering, and transportation engineering.

Keywords

Freshmen, Engineering, Infrastructure

Introduction

Rowan University began offering a new two-credit course called Introduction to Infrastructure (I2I) in Spring 2015. This course is required for all freshmen in the Department of Civil and Environmental Engineering (CEE) at Rowan. The course was developed as part of a collaborative project funded by the National Science Foundation's Transforming Undergraduate Education in Science, Technology, Engineering, and Mathematics (NSF-TUES) Program. The collaborative group of colleges and universities involved in this NSF-TUES project is led by the University of Wisconsin-Platteville (UW-P) and is called the Center for Infrastructure Transformation and Education (CIT-E)[1].

The topics covered in the course include an introduction to infrastructure, public financing and economics, social impacts of infrastructure, water resources engineering, environmental engineering, geotechnical engineering, structural engineering, and transportation engineering. The course also includes guest lectures by other CEE faculty. A total of 64 students were enrolled in two sections of the course during Spring 2015. The course was assessed using student pre- and post-surveys. The results of these surveys are presented below. In addition to these pre- and post-surveys, new online student surveys developed by CIT-E were implemented beginning in Spring 2016.

Rowan University. The questions s were the same. Many of the questions used for these surve us survey used at UW-P. In order to meet IRB requirement of the students had to be maintained throughout the survey ned random numbers on their syllabi and they proceeded t pre- and post-surveys. This enabled direct com survey responses. Four of the quantitativ the surveys will be discussed here:

Question 1 – Which is the most appr

For this question, the correct answer increased slightly from the pre-survey t correct before the class began and 46.3% g comparison, the pre-survey and post-survey per respectively. This indicates that more emphasis was p 2015 versus Spring 2016. As a result of these Spring 2015 and more emphasis will again be placed on sustainability for the third offe to Infrastructure course in Spring 2017.

Question 2 – If you were to characterize the state of the nation's infrastructure (roads, bridges, sewers, water supply, etc.) using a typical grade scale, what grades do you think would be most appropriate?

For this question, the correct answer is "c". For 2016, the number of students who chose "c" significantly increased from the pre-survey to the post-survey: 29.2% of students got Question 2 correct before the class began and 89.6% got the question correct after the class ended. This is very similar to the pre-survey and post-survey percentages for Spring 2015 which were 39% and 89%, respectively. Thus, the emphasis placed on grading the nation's infrastructure for the Spring 20 2016 offerings of the course will be continued for the third offering of the Intr rastructure course in Spring 2017.

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toward geotechnical engineering, transportation engineering, and other with no change in water resources engineering. We assume that the changes in student preferences both years were a result of student knowledge gained during the course, especially in areas, such as geotechnical engineering and transportation engineering, that students may not have known as well before the course began.

Question 10 – What is your current level of interest in pursuing a career in civil engineering?

For this question, the answers included a) very high, b) high, c) moderate, d) low, and e) very low. For 2016, the before and after responses were a) 43.1% versus 52.2%, b) 43.1% versus 35.8%, c) 13.9% versus 7.5%, d) 0.0% versus 3.0%, and e) 0% versus 1.5%. Of the 61 students who registered both before and after survey responses to this question, the number of students whose interest in civil engineering increased during the semester was 14, the

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Dr. Jenahvive K. Morgan currently teaches EGR 100 - Introduction to Engineering Design at Michigan State University. For the past three years, she has taught freshman and sophomore engineering courses at Rowan University in Glassboro, NJ. Dr. Morgan has a PhD and MS in Environmental Engineering from the University of Michigan, and a BS in Chemical Engineering from Michigan State University. Her teaching experience includes work as a graduate student facilitator and engineering teaching consultant. She is a member of the American Society of Civil Engineers (ASCE) and is an ASCE ExCEEd (Excellence in Civil Engineering Education) Fellow, 2014.

Joseph Daraio

Joseph A. Daraio, Ph.D. P.Eng, graduated from the University of Iowa in 2009 with a doctorate in civil and environmental engineering-hydraulics. He was a post-doc at Tennessee Technical University from 2009-2010, and a post-doc at North Carolina State University from 2010 to 2012 before beginning as an assistant professor at Rowan University. Dr. Daraio moved to a position as assistant professor at Memorial University of Newfoundland in St. John's in 2015, and is currently a licensed professional engineer in the province of Newfoundland and Labrador. His research interests are in water resources sustainability, modeling climate change impacts on hydrology and storm water infrastructure, and in the area of ecohydraulics.