VIPER (VIPR)  

VIPR 1200 Vagelos Integrated Program in Energy Research (VIPER)  
Seminar, Part I  
This is the first part of the two-semester seminar designed to introduce students to the VIPER program and help them prepare for energy-related research. During this course, invited speakers from across Penn will share their research to introduce students to a breadth of different topics within energy science, and research articles on various energy-related topics will be discussed. Students will be provided guidance on how to identify research groups of interest and reach out to faculty members in preparation for their research projects during the summer. Library research, presentation of data, basic research methods, research ethics, data analysis, and advisor identification will also be discussed. Students will develop their scientific research skills by reviewing scientific literature and synthesizing their findings, and they will build their collaboration skills by regularly working together in small, interactive student groups. Sample energy topics discussed will include: Applications of nanostructured materials in solar cells; Solid oxide fuel cells; Global climate modeling: radiant heat transfer; Nanocrystal-based technologies for energy storage; Photo-bioreactor systems for mass production of micro-algae; Advanced rare earths separations chemistry; Modeling of oxides for solar energy applications; and Electronic transport in carbon nanomaterials. Admission to VIPER program required to enroll.  
Spring  
0.5 Course Units  

VIPR 1210 Vagelos Integrated Program in Energy Research (VIPER)  
Seminar, Part II  
This is the second part of the two-semester seminar designed to introduce students to the VIPER program and help them prepare for energy-related research. Students will build upon their work in VIPR-120 crafting scientific research projects, and in VIPR-121, they will focus on how to communicate science effectively using a variety of different platforms. Students will develop their communication skills by critically thinking about elements of content development and visual design to best engage with their audience, and they will develop their collaboration skills by regularly working together in small, interactive student groups and by providing peer feedback to each other. Students will continue to discuss how to conduct research ethically and responsibly as well as critically evaluate the systems used to communicate science and their challenges.  
Fall  
Prerequisite: VIPR 1200  
0.5 Course Units