

# VIPER (VIPR)

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## 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

## VIPR 1300 VIPER Undergraduate Energy Research and Leadership Development

This course is designed to support and prepare students in the Vagelos Integrated Program in Energy Research (VIPER) in their on-going commitment to research activities and enhance their development as energy research leaders. This course is offered in the summer, fall, and spring terms, and module assignments will be specific to the term, as described below. Students are expected to complete a minimum number of graded module assignments which can be tailored to reflect their current research efforts and plans. This structure is designed to support sophomore, junior, and senior students throughout their undergraduate career. Students may register repeatedly for VIPR-1300 as they continue with their research experiences throughout their undergraduate career. Activities include making arrangements to conduct VIPER research over the summer, reading scientific literature related to their summer research projects, writing reports in preparation for and summarizing their summer research activities, summarizing and reflecting on their on-going research efforts during the semester, being actively involved in energy-relevant activities and submitting reflections about their experiences, and preparing materials for and presenting their energy research to the Penn community in the form of poster sessions and/or campus-wide presentations.

Fall, Spring, and Summer Terms

Prerequisite: VIPR 1200

0-0.5 Course Units