Office of Academic and Student Affairs
6426 Boelter Hall

Civil and Environmental Engineering
Additional Elective Options (effective Fall 2018, 3/20/18)

Atmospheric and Oceanic Sciences 102

102. Climate Change and Climate Modeling

Units: 4

Lecture, three hours; discussion, one hour. Enforced requisites: Mathematics 3C or 32A, Physics 1B or 6C, with grades of C or better. Global environmental issues in climate change due to human activities or natural climate variations. Quantitative introduction to new science of climate modeling to understand and predict these changes. Physical processes in climate system. Atmospheric and oceanic circulation. El niño and year-to-year climate prediction. Greenhouse effect and global warming. P/NP or letter grading.

Atmospheric and Oceanic Sciences 141

141. Introduction to Atmospheric Chemistry and Air Pollution

Units: 4
Lecture, three hours; discussion, one hour. Requisites: Chemistry 14B or 20B, Mathematics 3A or 31A, Physics 1B or 6B. Physical and chemical processes that determine composition of atmosphere and its implications for climate, ecosystems, and human welfare. Origin of atmosphere. Nitrogen, oxygen, carbon, sulfur, trace metal cycles. Climate and greenhouse effect. Atmospheric transport and turbulence. Stratospheric ozone. Oxidizing power of atmosphere. Regional air pollution: aerosols, smog, mercury, and acid rain. Letter grading.

Earth, Planetary, and Space Sciences 100

100. Principles of Earth Science

Units: 4
Lecture, three hours. Designed for nonmajors. Not open to students with credit for course 1. Fundamentals of physical geology and Earth history; major problems of geology, such as continental drift and development of large-scale features of Earth; physical and biological evolution. P/NP or letter grading.

Earth, Planetary, and Space Sciences 101

101. Earth's Energy: Diminishing Fossil Resources and Prospects for Sustainable Future

Units: 4
Lecture, three hours; laboratory, two hours; two optional field trips. Preparation: one lower division atmospheric sciences, chemistry, Earth sciences, or physics course. Earth's energy resources (fossil fuels and alternatives) from Earth science and sustainability perspective. P/NP or letter grading

Environment 157

157. Energy, Environment, and Development

Units: 4
Lecture, three hours. Requisites: Mathematics 3A and 3B (or 31A and 31B), Physics 1A and 1B (or 6A and 6B). Introduction to basic energy concepts and examination of role of various energy sources, energy conversion technologies, and energy policies in modern life. Analysis of implications of current patterns of energy production and consumption for future economic and environmental well-being. Integration of concepts and methods from physical and life sciences, engineering, environmental science, economics, and public policy. Basic quantitative skills provided to analyze and critique technical, economic, and policy choices to address challenge of balancing economic growth and environmental sustainability. P/NP or letter grading.

Environment 166

166. Leadership in Water Management

Units: 4
Lecture, three hours; discussion, one hour. Limited to juniors/seniors. Examination of water quality and water supply issues, including interactions between scientific, technological, management, and policy issues. Invited experts, scholars, and practitioners discuss relevant issues such as pollution, climate change, and water infrastructure. Emphasis on solutions involving integrated water supply and wastewater systems. Leadership development through writing instruction and negotiations and media training. P/NP or letter grading.

Mechanical and Aerospace Engineering 166C

166C. Design of Composite Structures

Units: 4
Lecture, four hours; discussion, two hours; outside study, six hours. Enforced requisite: course 156A or 166A. History of composites, stress-strain relations for composite materials, bending and extension of symmetric laminates, failure analysis, design examples and design studies, buckling of composite components, nonsymmetric laminates, micromechanics of composites. Letter grading.

M168. Introduction to Finite Element Methods

Units: 4
(Same as Civil Engineering M135C.) Lecture, four hours; discussion, one hour; outside study, seven hours. Requisite: course 156A or 166A or Civil Engineering 130. Introduction to basic concepts of finite element methods (FEM) and applications to structural and solid mechanics and heat transfer. Direct matrix structural analysis; weighted residual, least squares, and Ritz approximation methods; shape functions; convergence properties; isoparametric formulation of multidimensional heat flow and elasticity; numerical integration. Practical use of FEM software; geometric and analytical modeling; preprocessing and postprocessing techniques; term projects with computers. Letter grading