

COURSEWORK

Students can take up to 18 credit hours while at the Thailand Field Site, with 15 hours during the normal June through September semester. The available courses are:

Introduction to Environmental Chemistry: Presents important environmental topics and issues from an environmental chemistry perspective. Instructors: Professors Richard Kamens, Shabbir Gheewala and Savitri Gariviat (3 credit hours for UNC-equivalent course ENST 403); *Life Cycle Analysis (LCA)*: Introduces the LCA framework and procedure, outlines how to define and model a product's life cycle, and provides an overview of available methods and tools for tabulating and compiling associated emissions and resource consumption. Instructor: Gheewala (3 credit hours for UNC equivalent course ENST 307); *Common Techniques Used in Environmental Analysis*: Class and associated labs describe the use of gas and liquid chromatography in air and water environmental analysis along with mass spectrometry techniques and related wet chemical methods. Instructor: Gariviat and staff (3 credit hours for UNC equivalent ENST 490); *Capstone Research*: Built around a team-based, interdisciplinary research project related to issues of energy and the environment. Instructors: Kamens, Gariviat and Gheewala (3 credit hours for UNC equivalent ENST 698); *Introduction to Environmental Modeling Applications*: Exposes students to three environmental modeling packages that are typically used in the air and sub layer (groundwater) environments. Instructors: Kamens, Gheewala and Gariviat (3 credit hours for UNC equivalent ENST 415).

The above classes are supplemented, as needed, by *ENST 395: Research in Environmental Sciences and Studies for Undergraduates*. In addition, there are a number of other JGSEE classes, such as: *Environmental and Energy Policy*; *Energy and Environmental Economics and Policy*; *Energy and Environmental Management and Planning*; and *Energy from Biomass*.

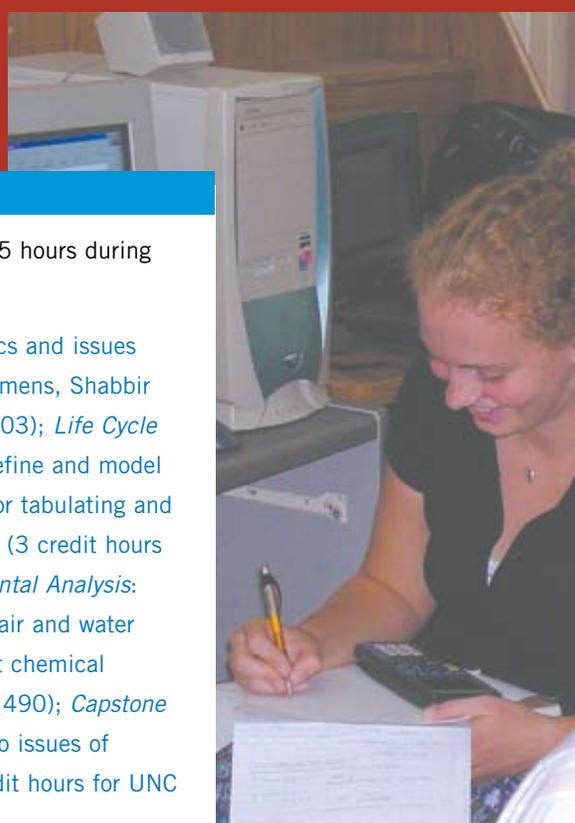
Thai Culture, is offered in the spring semester. It is currently a one credit seminar class, and necessary for all who go to the Field Site. Two Thai dialogues and vocabulary lists will be presented each week. We will also discuss readings from the book *Thai Culture in Transition* and become familiar with proper manners and behavior in Thai culture. Instructor: Kamens.

LOCATION

We are honored that Thailand is the host country for one of the IE international field sites, because it is viewed by the surrounding countries of Southeast Asia as a model for future development. Thailand has international environmental programs that train people from Vietnam, Malaysia, the Philippines, China, Indonesia and Laos. Many of the environmental/energy related problems experienced in Thailand today are, or will be, experienced in other developing/industrializing countries. The Thailand Field Site itself is hosted by King Mongkut's University of Technology Thonburi (KMUTT). Coursework is taught through the Joint Graduate School of Energy and the Environment (JGSEE, www.jgsee.kmutt.ac.th), an international institute focused on research and education in the links between energy provision and environmental quality. Participating students live in one of the campus dormitories at KMUTT.

FIELD TRIPS

An important part of the Thailand Field Site experience is field trips to different parts of Thailand. Guided by local experts and scholars, the trips integrate the cultural, ecological and economic issues in the country's diverse communities. As comfort with the peaceful Thai lifestyle and language proficiency increases, UNC students, along with their Thai student colleagues, often take trips to Hill Tribe villages, or go on mountain rafting and elephant treks. Some even visit Laos and Malaysia, or Thai rural communities that have not changed very much in the past century. This provides yet another unique dimension to undergraduate scholarly and cross-cultural learning, which was once only possible at small, expensive liberal arts colleges. Visit one of the previous IE student Thai web sites: www.kmutt.ac.th/organization/kmutt_cep/myweb4/ www.kmutt.ac.th/organization/kmutt_cep/





STUDENT RESEARCH AND THE CAPSTONE

Each student enrolled at the Thailand Field Site participates in a Capstone: a team-based research project that draws on Thai collaborators from universities, government and private-sector organizations. Capstones provide opportunities for teams of three to four UNC students and three to four Thai graduate students to work with UNC and Thai faculty and other environmental professionals. This team-based research enriches the Thailand Field Site students' cross-cultural academic experience and provides a context for the exchange of ideas and sharing of research approaches. The Capstone research groups are in close contact with UNC faculty via email and UNC faculty visits to Thailand.

Each year a project theme is selected to focus on topics that involve energy and the environment. This may also include air and water quality problems in Thailand and the rest of Southeast Asia, or sustainable mobility/transportation issues. For example, an air-quality Capstone potentially includes opportunities for monitoring, data analysis and modeling studies. The combined UNC-Thai groups typically meet each week during the June-October semester and inform each other of progress and set future goals. From mid-October to mid-December the group works on the Capstone project full time. We have received feedback from former students that being a part of a joint research group focused on a problem or set of problems was very helpful in their first job interviews after graduation.



RECENT CAPSTONE PROJECTS AT THE THAILAND FIELD SITE

In 2001, students worked on types of possible crops/biomass that potentially can be used for ethanol production; GIS mapping of transportation systems, crops, population densities and available land; the economics of generating ethanol versus selling biomass crops directly; modeling ethanol-vehicle impacts on the Bangkok atmosphere; and evaluation of current and future ethanol technologies, costs of production, and policy and market incentives. The 2002 group looked at the energy balance associated with the ethanol production in Thailand and modeled the impact of ethanol fuel replacement on ozone formation in Bangkok. They found that, given the available ethanol technology, ethanol production was energy negative and would considerably impact Bangkok smog if used on a large scale. Their sister group successfully modeled ozone formation in the northern Thai city of Chiang Mai. The 2003 group found that polynuclear aromatic hydrocarbons (PAHs), which are potential carcinogens, distribute in the Bangkok atmosphere between gases and particles in a manner predicted by theory. A novel way of predicting sulfur dioxide deposition on rice patties was investigated and lead exposures from batteries was described. The 2004 and 2007 groups explored the feasibility of biodiesel as an energy source in Southeast Asia. An energy life cycle analysis approach demonstrated that, unlike ethanol, biodiesel production was energy favorable and, if fully implemented, could significantly impact all of Bangkok's petroleum diesel needs. The 2008 group explored the "Feasibility of Nuclear Energy in Thailand" and "The Energy Uses of Rice Straw".





UNC
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ABOUT THE INSTITUTE

The UNC Institute for the Environment is the multidisciplinary program leading UNC-Chapel Hill's world-renowned environmental community in educating practitioners, researching and solving global challenges, and informing people about critical issues. It focuses on four main areas: balancing energy production and environmental quality, protecting human and ecosystem health, assisting environmental policy makers with making decisions, and developing sustainable community design principles and practices.

FACULTY

UNC Professor of Environmental Sciences and Engineering (School of Public Health) Richard Kamens {kamens@unc.edu, 919-966-5452} directs the Thailand Field Site from the UNC side. He was in the Peace Corps in Thailand between undergraduate and graduate school and was a Fulbright visiting professor there in 1998. He is an internationally recognized atmospheric chemist; his research interests are modeling aerosol formation in the atmosphere and heterogeneous reactions of semi-volatile organics. He has a new "state of the science" large aerosol outdoor smog chamber facility near UNC that is used to provide realistic data for his predictive aerosols models.

Associate Professor Dr. Sirintornthep Towprayoon {sirin@jgsee.kmutt.ac.th} will be responsible for the program and the well-being of UNC students while they are in Thailand. She is chair of the Environment Division in JGSEE and conducts research in municipal solid waste management, biogas from waste, greenhouse gases, methane emissions, acid rain and its impact, and climate change.

TIMING | COST | CREDIT HOURS

The IE Thailand Field Site is intended for rising UNC juniors and seniors. Students are encouraged to begin planning in their sophomore year if they wish to go to Thailand. The program runs from June to December because, at many Thai universities, the summer semester starts at the beginning of June and goes through the middle of October. During this time, UNC and Thai students at the site take classes and begin defining and developing their research projects. By October, the team is in a position to direct its energies toward its Capstone research project. UNC students return to North Carolina in time to start the spring semester and complete their junior or senior year.

The UNC Study Abroad Office in the College of Arts and Sciences coordinates applications for attendance at the IE Thailand Field Site. The Study Abroad Office has set a mid-February deadline for applications.

AWARDS AVAILABLE TO STUDENTS ATTENDING THE SITE

The Bill Glaze Award, a \$1,200 award to a UNC student each year, is available. This award was made possible by founding Carolina Environmental Program Director Bill Glaze (the Carolina Environmental Program was the predecessor of the Institute for the Environment). If you win this award, its payment is contingent upon your acceptance to, and actual attendance at, the next session of the Thailand Field Site.

FOR FURTHER DETAILS AND AN APPLICATION

Please contact the Institute for the Environment at (919) 966-9922 or send an email to ie@unc.edu. You may also visit the web site at www.ie.unc.edu.



THAILAND FIELD SITE

KENAN INSTITUTE ASIA - BANGKOK, THAILAND

The UNC Institute for the Environment's Thailand Field Site offers a six-and-one-half month overseas experience. It is based at King Mongkut's University of Technology Thonburi (KMUTT; see www.kmutt.ac.th for more information about KMUTT). We also collaborate very closely with the Kenan Institute Asia in Bangkok, which is directly affiliated with the UNC Kenan-Flagler Business School. The site's annual program generally runs from the end of May to December. While UNC undergraduates are at the Thailand Field Site, they team with Thai students, take classes consistent with their degree program at UNC, and perform a research Capstone project that emphasizes multidisciplinary teamwork. UNC Thailand Field Site students live in Thai dorms, become involved in Thai culture, and have the opportunity to travel and go on field trips. They begin their Thailand Field Site experience at UNC, in the spring semester before leaving for Thailand, with an introduction to Thai language and culture.