MAE Department offers new courses

The Mechanical and Aerospace Engineering Department has added five new courses to its offerings this semester, covering the mechanical and aerospace undergraduate program as well as the graduate program in mechanical engineering.

NMSU's Southwest Technology Development Institute placed this solar array at its site on the southeast section of the campus.

Ian Leslie is presenting **"Alternate and Renewable Engergy"** in response to increasing global interest in developing renewable energy sources and improving efficiencies of traditional systems. This course is offered as an upper level UG course (ME 405 Special Topics) and also is applicable to the master's degree (ME 510 Special Topics).

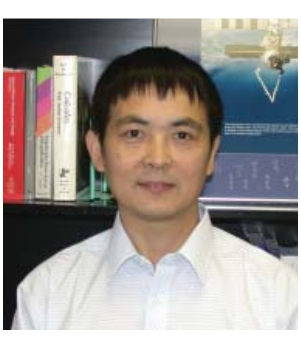
Leslie recognized the need for such a course and that a number of students were very interested in the subject. This, he said, is not surprising given the tremendous challenges facing the United States and the world. "The students in the class know they must be part of the solution and are stepping up to the challenge.

The course will look at various aspects of solar energy (photovoltaic and thermal), wind energy, renewable biomass and biofuels, and nuclear. While nuclear is not a traditional renewable, it has some of the qualities - such as low carbon footprint and the potential for many decades of operation. Other areas that will be included are hydroelectric and ocean energy harvesting.

Ian Leslie

"One of my goals" Leslie explains, "is to provide the students with a clear-eyed understanding of the various technologies - strengths as well as current shortcomings." The book for the class is "Sustainable Energy -without the hot air", by David MacKay of Cambridge University. The book is about numbers rather than adjectives. Leslie quotes the great physicist Richard Feynman as saying, "For a successful technology, reality must take precedence over public relations, for nature cannot be fooled". While future implementation of renewables will involve the push and pull of politics, it is essential that the engineers who will be an integral part of the process know what they are talking about, and have the tools to do their job.

Aerospace Systems Engineering (AE 424), taught by professor Ou Ma, is being offered for the first time. This course in an introduction to the theory and practice of systems engineering with an emphasis on applications in aerospace engineering discipline. Course objectives include: introduction to fundamentals of systems engineering theory and practice; knowledge and comprehension of the value and purpose of systems engineering principles and process; a working knowledge of the methods and tools; and an understanding of the role of systems engineers.



Ou Ma

The inclusion of this course completes the required curriculum for the Aerospace Engineering program initiated in Fall 2006. Nine courses are included, seven of which are offered each semester.

Graduate Program additions

The department has been conducting a significant analysis and refining of its graduate program for the past two years, focusing on requirements and offerings.

"We are experiencing increased enrollment in our program and anticipate the trend to continue," Igor Sevostianov, graduate program director, explains. "Our graduate faculty has also increased, further expanding interest areas. We are adding and revising courses to reflect this growth ."

A total of four new courses are being presented this semester, including the Alternative Energy course described above.

Anastasia Dobroskok

Anastasia Dobroskok, the department's newest faculty member, is teaching **Continuum Mechanics (ME 504)** which she describes as: "The course in Continuum Mechanics covers the basics of theory describing the response of materials to the application of various loads. The description is done through formulating general principles of mechanical behavior of materials in mathematical terms and by establishing the relationships governing the processes. The course includes topics in the relevant fields of calculus, solid mechanics and Newtonian fluids."

Chunpei Cai

MAE professor Chunpei Cai is presenting a Special Topics course (ME 510) entitled, **Introduction to Plasmadynamics and Space Weather.** Physics Professor Emeritus Paul Higbie is also contributing to the course. Just as weather conditions influence our travel plan's whether it is icy or snowy roads that challenge ground vehicles, or planes delayed by storms hundreds of miles away from the departure gate, weather in higher altitudes effects the safety of spacecraft.

A documented need on the local/state level prompted the inclusion of this course. Its material is a progression from Cai's Special Topics course in Rarefied Gas Dynamics offered last spring, but is more closely relate to Aerospace Engineering topics. "We will focus on developing the knowledge and skills to identify and summarize major space weather phenomena and related facts. Four elements of estimation include neutral gas/plasma drag and momentum, radiation and hypervelocity impacts/shield theory."

Mingjun Wei

A fourth new offering on the graduate level is **Advanced Computational Fluid Dynamics** (ME 534), taught by MAE professor Mingjun Wei. This course is representative of the kinds of developments taking place in the graduate program curriculum. According to Wei, "With the rapid development of computer technology and associated numerical algorithm, instruction in computational fluid dynamics (CFD) must go beyond the fundamental course(ME 533) to provide our graduate students with the necessary level of skills in this area. ME 534 will cover both state-of-the-art techniques and some classical methods not included in the lower-level ME 533 CFD course. In particular, high-performance parallel compouting will be taught to our graduate students for the first time as we are now living in an era where even a desktop PC runs with multi processors."

Three additional graduate courses will be introduced in the Spring 2010 semester. These are: Plasticity (ME 505), Nonlinear Structural Dynamics (ME 525), and Vorttex Dynamics (ME 537).