Instructors
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Credit: 1 hour

Meeting times and place
Tuesdays, biweekly, 2 to 5 pm, Joint Institute for Heavy Ion Research, Building 6008, Oak Ridge National Laboratory

Course description
This course is primarily focused on the graduate students supported by the UTK-ORNL Distinguished Fellowship. The purpose of this course is to acquaint the students with the joint research that takes place in various fields of science and engineering at the Oak Ridge National Laboratory and the University of Tennessee Knoxville, to guide them in their choice of dissertation research topics and to broaden their background in the grand issues in various fields, including energy and climate. In the 14 weeks of the semester, seven topics will be chosen for presentations, tours, readings, and paper writing. These topics will include the major focus areas of this distinguished fellowship program: materials science and engineering (including neutron science), computational science and engineering, and nuclear science and engineering. For each topic, an expert in the field of research from ORNL or from UTK will present a lecture on the topic and lead a tour of ORNL research facilities. A reading assignment will be given before the lecture and the students will be expected to write a short summary of that research area after the lecture and tour.

This course will focus in part on the energy technology solutions for the future as the country and the world face the problems of expanding population, increasing need for energy, eventual peak in the world production of petroleum, and the increasing realization that sustainable forms of energy supply must receive more emphasis in the future.
Possible lecture topics
• Neutron science, including a tour of the Spallation Neutron Source
• Computational science and mathematics, including a tour of Jaguar and Kraken computing centers
• Climate change
• Nuclear energy - Consortium for Advanced Simulation of Light Water Reactors - a DOE Energy Innovation Hub
• Nanoscience, including a tour of the Center for Nanophase Materials Science
• Bioenergy, including a tour of the BioEnergy Science Center
• Energy efficiency strategies, including a tour of the Building Technologies Research & Integration Center
• Nucleosynthesis in stars, including a tour of the Holifield Radioactive Ion Beam Facility
• Science and history of the Nuclear Age, including a tour of the Graphite Reactor site