

| <i>Course Title</i> | <i>Course No.</i> | <i>Description</i> | <i>Freq.</i> | <i>Instructor</i> |
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| Nuclear Engineering 2 | ENU 4104 | Static analysis of nuclear reactors including heterogeneous effects, multigroup calculations and generation of group constants. Dynamic analysis of reactors including feedback. Application of computer codes to reactor analysis. | Fall | Dugan |
| Thermodynamis, Heat and Mass Transfer in Nuclear Systems | ENU 4134 | Thermodynamic aspect of nuclear power, reactor heat generation and removal, heat transfer and fluid flow in nuclear systems with emphasis on light water reactors. | Fall | Anghaie |
| Nuclear and Radiological Laboratory | ENU 4505L | A study of the experimental procedures used in reactor operation, personnel monitoring, radiation detection devices and the statistics of nuclear counting systems. | Spring | Hintenlang |
| Radiation Interactions and Sources | ENU 4606 | Study of neutron interactions with matter; macroscopic cross sections for interactions of photons and neutrons and their applications for shielding and dosimetry calculations; attenuation and absorption of radiation from distributed sources in simple and complicated geometries. | Spring | Hintenlang |
| Applied Radiation Protection | ENU4641C | Introduction to practical radiation protection techniques and practices including laboratory experiences. Examination of pertinent regulations, current practice, ethics, and instrumentation/measurement practices. Design of facilities and controls to optimize benefits of radiation applications and minimize exposure risks. | Spring | Bolch |
| Reliability and Risk Analysis | ENU 5142 | Nuclear facilities' safety systems including reliability and probabilistic risk assessment. | Annual | Vernetson |
| Principles of Nuclear Reactor Operation | ENU 5176 | Principles of control and operation; problems of power reactor operations. | Annual | Vernetson |
| Reactor Fuel Cycles | ENU 5186 | Advanced fuel management, nodal code evaluation of criticality, power peaking and sharing throughout the operation cycle, with reshuffle and reload. Investigation of the uses of burnable control poisons for uranium and plutonium cycles. | Annual | Tulenko |
| Nuclear Reactor Dynamics & Controls | ENU 5196 | Control theory analysis applied to nuclear power reactor dynamic models with feedback and to integrated nuclear power plant dynamic models with feedback. | Annual | Vernetson |
| Space Nuclear Power and Propulsion | ENU 5351 | Theory and design of space nuclear power sources including radioisotope thermoelectric generators and reactor power plants. Associated systems and components important for energy | Annual | Dugan |
| Nuclear Engineering Laboratory II | ENU 5516L | Laboratory Practice in neutron and gamma detection and analysis. Determination of basic neutron parameters in non conversion, heat transport and rejection, shielding and safety. | Spring | Hintenlang |
| Radiation Detection & Instrumentation | ENU 5615 | Interaction of radiation with matter, radiation detector systems, pulse shaping, amplification, amplitude, and time-analyzing circuitry; counting and measuring devices, and control systems for nuclear reactors | Annual | Bolch |
| Radiation Detection & Instrument. Lab | ENU 5615L | 1-credit laboratory to accompany ENU 5615 | Annual | Bolch |
| Radiation Biology | ENU 5626 | Effects of radiation on biological molecules, cells, and man including cancer and mutagenesis; use of radiation in the treatment of disease. | Annual | Hintenlang |
| Advanced Concepts for | ENU 5705 | Nuclear Energy Plasmas and thermonuclear fusion; fast reactors, advanced LWR's, and other advanced fission reactors; nuclear pumped; TE, TI, and MHD conversion and Stirling engines as applied to advanced reactor concepts. | Summer | Dugan |
| Radiation Interaction Basics & Appl. I | ENU 6051 | Interaction of x-rays, gamma rays, neutrons, and charged particles with matter; radioactive decay, nuclear moments, and nuclear transitions. Application to basic problems in nuclear engineering sciences | Fall | Anghaie |
| Radiation Transport Basics | ENU 6052 | Particle distribution functions. Elementary transport and statistical description of particulate matter. Development of transport relations and their solutions. Applications to basic problems in nuclear engineering sciences. | Annual | Haghighat |

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| Radiation Interaction Basics & Appl. II | ENU 6053 | Nuclear structure, stability and models; nuclear reactions; ionization of matter by charged particles, neutrons, and electromagnetic radiation; Monte Carlo transport | Spring | Anghaie |
| Nuclear Reactor Analysis I | ENU 6106 | Nuclear criticality, neutron transport equation, multigroup neutron diffusion theory, and perturbation theory. Reactor kinetics: point model, reactivity feedback, and space-time models. | Fall | Dugan |
| Nuclear Reactor Analysis II | ENU 6107 | Fast and thermal spectrum calculations for homogeneous and heterogeneous reactor cores. Nuclear reactor core design including nuclear and thermal hydraulic analyses. Core power distributions, composition changes, and reactivity control. | Spring | Dugan |
| Fast Reactor Plant Design and Technology | ENU 6147 | Theories of previous courses applied to analytical design and economics of an integrated fast reactor nuclear plant. | Summer | Dugan |
| Health Physics | ENV 6215 | Techniques of hazard evaluation and radiation control; monitoring methods; survey techniques; biological sampling; instrument calibration; exposure standards and radiation protection regulations; on-site radiation safety surveys and evaluation. | Annual | ESE Faculty |
| Radioactive Waste | ENV 6216 | Source, treatment, and disposal of radioactive waste. Emphasis on prevention of environmental contamination. | Annual | Bolch |
| Radiation Dosimetry | ENU 6623 | Concepts, dosimetry quantities and units, calculations for external gamma, beta, and neutron radiation, calculation of dose from internal radioactivity, dose measurement concepts, dose assessment from survey and personnel monitoring | Annual | Arreola |
| Advanced Radiation Shielding Design | ENU 6636 | Shielding design fundamentals. Methods of calculating gamma ray attenuation, fast neutron penetration, effects of ducts and voids in shields, problems of heat generation and deposition in reactor components. | Summer | Hintenlang |
| Nuclear Seminar | ENU 6935 | Discussion of research focusing on current trends in the radiation related industries, government and research establishment, with special focus on communication skills (including thesis and proposal writing), research skills, and ethics. Utilization of library resources and writing/publication skills, particularly with regard to technical presentations and mass communication will be emphasized. | Fall | Haghighat |
| Radiological Materials Transport | ENU 6937 | Review of mathematical and computational techniques of estimating radionuclide dispersion and environmental transport within air and water. Bioaccumulation factors and environmental aspects of population dose assessments. multiplying and multiplying media | Annual | Hintenlang |
| Monte Carlo Methods | ENU 6937 | The fundamentals of Monte Carlo methods are discussed; Random Variables/Numbers and their generation techniques and methodologies for testing randomness are introduced; fundamentals of probability and statistics are discussed; efficient sampling techniques are introduced; various variance reduction techniques and automation methods are discussed; implementation of Monte Carlo methods on parallel computers; Various current applications and performance issues are discussed. | Fall | Haghighat |